Z.
MOLL.
35
o
CAT

Lucia Paget
1854 –

POPULAR CONCHOLOGY.

LONDON:
A. and G. A. SPOTTISWOODE,
New-street-Square.

POPULAR CONCHOLOGY,

OR,

THE SHELL CABINET ARRANGED ACCORDING TO THE MODERN SYSTEM;

BRITISH MUSEUM
NATURAL HISTORY
Z D

WITH A

DETAILED ACCOUNT OF THE ANIMALS,

AND

A COMPLETE DESCRIPTIVE LIST OF THE FAMILIES AND GENERA OF RECENT AND FOSSIL SHELLS.

24 APR 1928
PURCHASED

BY AGNES CATLOW,

AUTHOR OF
"POPULAR FIELD BOTANY," "DROPS OF WATER," ETC.

SECOND EDITION.

LONDON:
LONGMAN, BROWN, GREEN, AND LONGMANS.
1854.

PREFACE

TO

THE SECOND EDITION.

The study of Conchology having made considerable advances within the last few years, the Author takes advantage of a second edition being required, to introduce a more modern arrangement, founded on the Molluscs themselves, instead of on their habitation. Beyond a doubt this is the most natural, and consequently the most scientific method of classifying the subject, the shells being in fact of little comparative importance, when the animals which construct them are philosophically considered; as they merely serve the purpose of concealment, or afford protection to the more delicate organs of the Mollusc. The labours of Cuvier, Blainville, Owen, Forbes, Philippi, and many others in the field of Malacology, have rendered even these shelly habitations much more interesting objects, than when they were looked upon only as pretty specimens for the cabinet; and in connection with their very curiously formed inhabitants, they present a study at once pleasing and wonderful, from their perfect mutual adaptation. The satisfaction derived from the possession of a cabinet of shells, cannot fail to be greatly heightened by their being scientifically arranged, and the pleasure they afford is infinitely increased, when a knowledge of the wonderfully constituted inhabitant is added to that of its beautiful habitation.

In the first edition of Popular Conchology the great work of

Lamarck was taken as the basis of the general arrangement; in the present, that of Dr. Philippi, published under the title of "Handbuch der Conchyliologie und Malacozoologie," has been selected as the foundation; in many cases the descriptions are a free translation from that Author, and consequently the system based upon the animal alone, has been explicitly followed.

The details of classes, families, and genera are derived from the most authentic sources; the works of Forbes and Philippi have been chiefly consulted for accounts of the Molluscs; and those of Sowerby, Reeve, Philippi, Swainson, and other writers, for the generic distinctions of the shells they inhabit. The present edition embraces also the fossil genera, which were omitted in the first. Though the descriptions are strictly scientific, and calculated to give a thorough insight into the history and habits of the Molluscous animals, the Author trusts that the young Conchologist will find something more in these pages than mere dry details, which are, however, quite necessary to afford a clear and practical insight into this fascinating pursuit.

The drawings for the woodcuts of the first edition were derived from the works of the author's friend, Mr. Swainson, with a few additions of her own; the new ones added in the present volume are from the pencil of Mr. Sowerby.

CONTENTS.

Page

INTRODUCTORY CHAPTER - - - - - 1

UNIVALVES.

CLASS I.—CEPHALOPODA - - - - - 23

ORDER I.—DIBRANCHIATA - - - - - - 25

SECTION I.—OCTOPODA - - - - - - 25

FAMILY I.—*Octopoda* - - - - - - 26
Polypus - - - - - - 26
Pinnoctopus - - - - - - 27
Moschites - - - - - - 27
Cirroteuthis - - - - - - 27
Argonauta - - - - - - 27

SECTION II.—DECAPODA - - - - - - 30

FAMILY II.—*Sepiacea* - - - - - - 31
Cranchia - - - - - - 31
Loligopsis - - - - - - 31
Histioteuthis - - - - - - 31
Onychoteuthis - - - - - - 31
Ommastrephes - - - - - - 32
Loligo - - - - - - - 32
Gonatus - - - - - - - 32
Sepiola - - - - - - - 33
Fidenas - - - - - - - 33
Sepioteuthis - - - - - - 33
Sepia - - - - - - - 33
Teuthopsis - - - - - - 34
Leptoteuthis - - - - - - 34
Beloteuthis - - - - - - 35

	Page
FAMILY III.—*Belemnitacea*	35
Beloptera	35
Conoteuthis	35
Belemnoteuthis	35
Belemnites	36
FAMILY IV.—*Spirulacea*	37
Spirula	37
Spirulirostra	37
ORDER II.—TETRABRANCHIATA	38
FAMILY I.—*Nautilacea*	38
Nautilus	39
Clymenia	41
Gyroceras	41
Lituites	41
Ascoceras	41
Cyrtoceras	42
Phragmoceras	42
Gomphoceras	42
Orthoceras	42
Trochoceras	43
FAMILY II.—*Ammonitacea*	44
Ammonites	44
Scaphites	45
Crioceras	45
Ancyloceras	45
Hamites	46
Ptychoceras	46
Toxoceras	47
Baculites	47
Turrilites	47
Helicoceras	48
CLASS II.—GASTEROPODA	48
Pectinibranchiata	50
Scutibranchiata	50
Cyclobranchiata	50
Cirribranchiata	50
Tectibranchiata	50

Page

Pulmonata - - - - - - 50
Nudibranchiata - - - - - 51
Heteropoda - - - - - - 51

ORDER I. — PECTINIBRANCHIATA - - - - - 51

SECTION I. - - - - - - - - 51

FAMILY I. — *Strombacea* - - - - - 52
Pteroceras - - - - - - 52
Strombus - - - - - - 53
Rostellaria - - - - - - 54
Dibaphus - - - - - - 54
Terebellum - - - - - - 55
Rostrotrema - - - - - - 55
Pterodonta - - - - - - 55
Spinigera - - - - - - 55

FAMILY II. — *Aporrhaidea* - - - - - 56
Aporrhais - - - - - - 56
Struthiolaria - - - - - - 57

FAMILY III. — *Conea* - - - - - - 57
Conus - - - - - - - 57

FAMILY IV. — *Pleurotomacea* - - - - - 59
Pleurotoma - - - - - - 59
Perrona - - - - - - 60
Clavatula - - - - - - 60
Defrancia - - - - - - 60
Daphnella - - - - - - 60
Mangelia - - - - - - 60
Bela - - - - - - - 61
Borsonia - - - - - - 61
Conopleura - - - - - - 61

FAMILY V. — *Muricea* - - - - - - 62
Fusus - - - - - - - 62
Fasciolaria - - - - - - 63
Turbinella - - - - - - 63
Ficula - - - - - - - 64
Cochlidium - - - - - - 64
Pyrula - - - - - - - 65
Murex - - - - - - - 66
Typhis - - - - - - - 67

	Page
Tritonium	67
Ranella	68
Purpura	69
Concholepas	70
Leptoconchus	71
Purpuroidea	71
Monoceras	72
Ricinula	72
Engina	73
Columbella	73
Columbellina	73
Pollia	74
Pisania	74
Nassa	74
Demoulia	75
Cyllene	75
Buccinum	76
Bullia	76
Terebra	77
Cancellaria	77
Admete	78
FAMILY VI. — *Cassidacea*	78
Cassis	79
Morio	80
Oniscia	80
Dolium	81
Eburna	81
FAMILY VII. — *Volutacea*	82
Voluta	82
Mitra	84
FAMILY VIII. — *Olivacea*	85
Oliva	85
Ancillaria	86
Harpa	87
FAMILY IX. — *Cypræacea*	88
Cypræa	88
Erato	91
Ovula	91
Marginella	91

Page

FAMILY X.—*Coriocellacea* - - - - - 92
Marsenia - - - - - - 92

SECTION II. - - - - - - - 93

FAMILY XI.—*Turritellacea* - - - - - 93
Turritella - - - - - - 93
Proto - - - - - - - 94
Murchisonia - - - - - - 95
Cerithium - - - - - - 95
Triforis - - - - - - 96

FAMILY XII.—*Paludinacea* - - - - - 96
Paludina - - - - - - 97
Melania - - - - - - 98
Litiopa - - - - - - 99
Planaxis - - - - - - 99
Quoya - - - - - - 100
Macrocheilus - - - - - - 100
Holopea - - - - - - 100
Rissoa - - - - - - - 100
Jeffreysia - - - - - - 101
Rissoina - - - - - - 101
Lacuna - - - - - - 102
Fossarus - - - - - - 102
Adeorbis - - - - - - 103
Skenea - - - - - - 103
Orbis - - - - - - 103
Assiminea - - - - - - 103
Litorina - - - - - - 104
Modulus - - - - - - 105
Risella - - - - - - 105
Solarium - - - - - - 106
Bifrontia - - - - - - 106
Valvata - - - - - - 107

FAMILY XIII.—*Scalariacea* - - - - - 107
Scalaria - - - - - - 107

FAMILY XIV.—*Janthinacea* - - - - - 108
Janthina - - - - - - 108

FAMILY XV.—*Stylinacea* - - - - - 109
Stylina - - - - - - 110

	Page
FAMILY XVI.—*Naticacea*	111
Natica	111
Cernina	112
Deshaysia	112
Sigaretus	112
Amaura	113
Laguncula	113
FAMILY XVII.—*Velutinacea*	113
Velutina	113
Trichotropis	114
Calcarella	115
FAMILY XVIII.—*Naricacea*	115
Narica	115
Neritopsis	116
FAMILY XIX.—*Xenophoracea*	116
Xenophora	116
FAMILY XX.—*Calyptræacea*	118
Dispotæa	118
Crucibulum	118
Mitrularia	118
Trochita	119
Galerus	120
Crepidula	120
Capulus	121
Brochia	122
Spiracella	123
Pedicularia	123
FAMILY XXI.—*Ringiculacea*	123
Ringicula	124
Cinulia	124
Tylostoma	124
Globiconcha	125
FAMILY XXII.—*Pyramidellacea*	125
Pyramidella	125
Odontostoma	126
Monoptygma	126
Turbonilla	126
Nerinea	127

Page

FAMILY XXIII.—*Eulimacea* - - - - - 127
Eulima - - - - - - 128
Subulites - - - - - - 128
Aclis - - - - - - - 128
Rissoella - - - - - - 128

FAMILY XXIV.—*Vermetacea* - - - - - 129
Vermetus - - - - - - 129
Magilus - - - - - - 130
Siliquaria - - - - - - 131

FAMILY XXV.—*Cœcacea* - - - - - 131
Cœcum - - - - - - 132

FAMILY XXVI.—*Siphonariacea* - - - - 132
Siphonaria - - - - - - 133
Gardinia - - - - - - 133

FAMILY XXVII.—*Acmæacea* - - - - - 133
Acmæa - - - - - - 134
Lepeta - - - - - - 134
Jothea - - - - - - 134

ORDER II.—SCUTIBRANCHIATA - - - - - 135

FAMILY I.—*Neritacea* - - - - - - 135
Nerita - - - - - - 135
Navicella - - - - - - 137
Pileolus - - - - - - 137

FAMILY II.—*Trochacea* - - - - - 138
Phasianella - - - - - - 138
Turbo - - - - - - - 139
Liotia - - - - - - - 139
Delphinula - - - - - - 140
Vitrinella - - - - - - 140
Calcar - - - - - - - 140
Astralium - - - - - - 141
Globulus - - - - - - 141
Trochus - - - - - - 141
Euomphalus - - - - - - 143
Rhaphistoma - - - - - - 143
Scalites - - - - - - 143

	Page
Cyrtolites	144
Bankivia	144
Stomatia	144
Stomatella	144
Broderipia	145
Anatomus	145
Pleurotomaria	145
Trochotoma	146
Cirrus	146
Haliotis	146
FAMILY III.—*Fissurellacea*	149
Emarginula	149
Scutum	150
Rimula	150
Fissurella	151
Deridobranchus	152
ORDER III.—CYCLOBRANCHIATA	152
FAMILY I.—*Patellacea*	152
Patella	152
Carinaropsis	154
FAMILY II.—*Chitonacea*	154
Chiton	154
Nototrema	156
ORDER IV.—CIRRIBRANCHIATA	156
Dentalium	156
Cadulus	157
ORDER V.—TECTIBRANCHIATA	157
FAMILY I.—*Pleurobranchea*	157
Umbrella	157
Tylodina	158
Pleurobranchus	159
Pleurobranchæa	159
Posterobranchæa	159
FAMILY II.—*Aplysiacea*	160
Aplysia	160
Icarus	161

Page

Notarchus - - - - - - 161
Lophocercus - - - - - 161
Lobiger - - - - - - 162

Family III.—*Bullacea* - - - - - 162
Aplustrum - - - - - - 162
Cylichna - - - - - - 163
Amphisphyra - - - - - - 163
Bullinula - - - - - - 164
Bulla - - - - - - 164
Atys - - - - - - 165
Glauconella - - - - - - 166
Cryptophthalmus - - - - - 166
Xanthonella - - - - - - 166
Alicula - - - - - - 166
Acera - - - - - - 167
Scaphander - - - - - 167
Philine - - - - - - 168
Doridium - - - - - - 168
Gastropteron - - - - - 168
Atlas - - - - - - 169
Oxynoë - - - - - - 169
Actæon - - - - - - 169
Iteria - - - - - - 170
Actæonella - - - - - 170
Volvaria - - - - - - 170
Cylindrites - - - - - - 171

Order VI — Pulmonata - - - - - 171

Family I.—*Oncidiacea* - - - - - 171

Family II.—*Limacea* - - - - - 171
Vaginulus - - - - - - 172
Incilaria - - - - - - 172
Limax - - - - - - 172
Philomycus - - - - - - 172
Geomalacus - - - - - - 172
Janella - - - - - - 172
Parmacella - - - - - - 172
Testacella - - - - - - 172
Plectrophorus - - - - - - 173

	Page
FAMILY III.—*Helicea*	174
Daudebardia	174
Vitrina	174
Succinea	175
Helix	175
Anostoma	180
Tomigerus	180
Streptaxis	180
Proserpina	181
Bulimus	181
Achatinella	184
Achatina	184
Halia	185
Pupa	185
Cylindrella	186
Megaspira	186
Balea	186
Tornatellina	187
Clausilia	187
Lychnus	188
FAMILY IV.—*Auriculacea*	188
Scarabus	188
Auricula	188
Pedipes	189
FAMILY V.—*Limnæacea*	190
Chilina	190
Limnæa	190
Amphipeplea	191
Physa	192
Physopsis	192
Planorbis	192
Camptoceros	193
Ancylus	193
FAMILY VI.—*Amphibolacea*	194
Amphibola	194
FAMILY VII.—*Cyclostomacea*	195
Cyclostoma	195
Ferussina	196
Pupina	196

Page

Stoastoma - - - - - - 197
Helicina - - - - - - 197
Acme - - - - - - 198
Geomelania - - - - - - 198
Truncatella - - - - - - 198
Menestho - - - - - 199

Family VIII.—*Ampullariacea* - - - - 199
Ampullaria. - - - - - - 199

Order VII.—Nudibranchia - - - - - 201
Family I.—*Doridiacea* - - - - - 201
Family II.—*Tritoniacea* - - - - - 201
Family III.—*Æolidiacea* - - - - - 201
Family IV.—*Placobranchiacea* - - - - 202
Family V.—*Phyllidiacea* - - - - - 202
Order VIII.—Heteropoda - - - - - 202

Family I.—*Nucleobranchiata* - - - - - 203
Carinaria - - - - - - 203
Cardiopoda - - - - - - 204
Ceratophora - - - - - - 204
Pterotrachea - - - - - - 204

Family II.—*Atlantacea* - - - - - 204
Atlanta - - - - - - 205
Oxygyrus - - - - - - 205
Bellerophon - - - - - - 205
Bucania - - - - - - 206
Porcellia - - - - - - 206

Family III.—*Phyllirrhoacea* - - - - - 206
Phyllirrhoe - - - - - - 206

Family IV.—*Sagittacea* - - - - - 206

CLASS III.—PTEROPODA - - - - - 207

Order I.—Thecosomata - - - - - 209

Family I.—*Cavoliniacea* - - - - - 209
Cavolinia - - - - - - 209
Clio - - - - - - - 209
Balantium - - - - - - 210

Page

Vaginella - - - - - - 210
Creseis - - - - - - 210
Theca - - - - - - 210
Conularia - - - - - - 211
Coleoprion - - - - - - 211
Pugiunculus - - - - - - 211
Triptera - - - - - - 211

Family II.—*Cymbuliacea* - - - - - 211
Cymbulia - - - - - - 212
Eurybia - - - - - - 212
Psyche - - - - - - 212
Tiedemannia - - - - - 212

Family III.—*Limacinacea* - - - - - 213
Limacina - - - - - - 213

Order II.—Gymnosomata - - - - - 214

Family I.—*Clionacea* - - - - - 214

Family II.—*Pneumodermacea* - - - - 214

Family III.—*Cymodoceacea* - - - - - 214

CLASS IV.—CONCHIFERA - - - - - 214

Order I.—Dimyaria - - - - - - 220

Family I.—*Tellinacea* - - - - - 220
Venus - - - - - - 221
Artemis - - - - - - 222
Tethis - - - - - - 222
Cyprina - - - - - - 223
Donax - - - - - - 223
Amphichœna - - - - - - 224
Grateloupia - - - - - - 224
Tellina - - - - - - 225
Psammobia - - - - - 226
Sanguinolaria - - - - - 226
Capsa - - - - - - 227
Mactra - - - - - - 227
Cardilia - - - - - - 228
Donacilla - - - - - - 228
Semele - - - - - 229

Page

Cumingia - - - - - - 229
Scrobicularia - - - - - 229
Erycina - - - - - - 230
Embla - - - - - - 230
Galatea - - - - - - 231
Cyrena - - - - - - 231
Villorita - - - - - - 232
Cyclas - - - - - - 232
Pisidium - - - - - - 232
Cyrenoida - - - - - - 233
Iphigenia - - - - - - 233
Glauconome - - - - - 234
Gnathodon - - - - - - 234

FAMILY II.—*Lithophaga* - - - - - 235
Saxicava - - - - - - 236
Petricola - - - - - - 237
Rupellaria - - - - - - 237
Clotho - - - - - - 238

FAMILY III.—*Anatinacea* - - - - - 238
Anatina - - - - - - 239
Periploma - - - - - - 239
Thracia - - - - - - 240
Magdala - - - - - - 240
Myodora - - - - - - 241
Pandora - - - - - - 241
Anatinella - - - - - - 242
Cochlodesma - - - - - - 242
Entodesma - - - - - - 243
Myochama - - - - - - 243

FAMILY IV.—*Corbulacea* - - - - - 243
Corbula - - - - - - 244
Neœra - - - - - - 244
Poromya - - - - - - 245

FAMILY V.—*Myacea* - - - - - 245
Lutraria - - - - - - 245
Mya - - - - - - 246
Panopæa - - - - - - 247
Pholadomia - - - - - - 247
Allorisma - - - - - - 248
Edmondia - - - - - - 248

		Page
	Glycimeris	248
	Tellinomya	249
	Arcinella	249
Family VI.	*Solenacea*	249
	Solen	250
	Psammosolen	251
	Cleidophorus	252
Family VII.	*Pholadea*	252
	Pholas	253
	Jouannetia	254
	Xylophaga	255
	Teredo	255
	Cuphus	257
	Teredina	257
Family VIII.	*Gastrochænacea*	257
	Gastrochæna	258
	Clavagella	259
	Aspergillum	259
Family IX.	*Cardiacea.*	261
	Cardium	261
	Protocardia	262
	Conocardium	263
	Goldfussia	263
	Isocardia	263
	Cardiomorpha	264
Family X.	*Chamacea*	264
	Chama	264
	Diceras	265
	Chamostræa	265
Family XI.	*Lucinacea*	266
	Lucina	266
	Fimbria	267
	Diplodonta	267
	Ungulina	268
	Scacchia	268
	Thyasira	269
	Chironia	269
	Kellia	269
	Lasea	270

Page

Lepton - - - - - 270
Cyamium - - - - - 271
Montacuta - - - - - 271

FAMILY XII. — *Galeommacea* - - - - - 272
Galeomma - - - - - - 272

FAMILY XIII. — *Astartacea* - - - - - 273
Arastte - - - - - - 273
Pronoë - - - - - - 274
Crassatella - - - - - - 274
Cardinia - - - - - - 274
Megalodon - - - - - - 275

FAMILY XIV. — *Carditacea* - - - - - 275
Cardita - - - - - - 276
Trapezium - - - - - - 276
Opis - - - - - - - 277
Myoconcha - - - - - - 277

FAMILY XV. — *Solenomyacea* - - - - - 277
Solenomya - - - - - - 278

FAMILY XVI. — *Arcacea* - - - - - 278
Arca - - - - - - - 278
Cucullæa - - - - - - 279
Scaphula - - - - - - 280
Orthonota - - - - - - 280
Pectunculus - - - - - - 280
Limopsis - - - - - - 281

FAMILY XVII. — *Nuculacea* - - - - - 281
Nucula - - - - - - 281
Nuculina - - - - - - 282
Leda - - - - - - - 282
Yoldia - - - - - - 283
Malletia - - - - - - 283
Lyrodesma - - - - - - 284

FAMILY XVIII. — *Trigoniacea* - - - - 284
Lyrodon - - - - - - 284
Schizodus - - - - - - 285

FAMILY XIX. — *Unionacea* - - - - - 285
Unio - - - - - - - 287
Paxyodon - - - - - - 288

		Page
	Castalia	288
	Monocondylæa	288
	Margaritana	289
	Anodonta	289
	Iridina	290
	Mycetopus	291
Family XX. — *Ætheriacea*		291
	Etheria	292
Order II. — Heteromyaria		293
Family I. — *Mytilacea*		293
	Mytilus	293
	Modiola	294
	Modiolaria	295
	Crenella	295
	Lithophagus	296
	Dreyssena	296
	Mytilimeria	297
	Byssanodonta	298
	Modiolopsis	298
	Hippopodium	298
Family II. — *Pinnacea*		298
	Pinna	299
	Pinnogena	300
Order III. — Monomyaria		301
Family I. — *Tridacnacea*		301
	Tridacna	301
	Hippopus	303
Family II. — *Malleacea*		303
	Avicula	304
	Pterinea	306
	Vulsella	306
	Myalina	307
	Ambonychia	307
	Posydonomya	308
	Malleus	308
	Crenatula	309
	Melina	309
	Gervillia	310
	Catillus	310
	Inoceramus	310

Page

Pulvinites - - - - - - 311
Pachymya - - - - - - 311

Family III. — *Pectinacea* - - - - - 311
Pedum - - - - - - 311
Lima - - - - - - - 312
Limea - - - - - - 313
Pecten - - - - - - 314
Hinnites - - - - - - 315
Spondylus - - - - - - 316
Plicatula - - - - - - 317
Sphæra - - - - - - 317

Family IV. — *Ostracea* - - - - - 317
Ostrea - - - - - - 317
Gryphæa - - - - - - 320
Exogyra - - - - - - 320
Carolia - - - - - - - 321
Pododesmus - - - - - - 321
Placuna - - - - - - 321
Placunanomia - - - - - 322
Anomia - - - - - - 323
Ænigma - - - - - - 324

CLASS V. — BRACHIOPODA - - - - - 324

Order I. — Ancylopoda - - - - - - 328

Family I. — *Terebratulidæ* - - - - - 329
Terebratella - - - - - - 329
Magas - - - - - - 330
Bouchardia - - - - - - 330
Terebratula - - - - - - 331
Gryphus - - - - - - 332
Terebratulina - - - - - - 332
Terebrirostra - - - - - - 332
Fissurirostra - - - - - - 333

Family II. — *Thecideadæ* - - - - - 334
Megathyris - - - - - - 334
Thecidium - - - - - - 334

Order II. — Helictopoda - - - - - 335

Family I. — *Spiriferidæ* - - - - - 335
Spirifer - - - - - - 335
Cyrtia - - - - - - 336
Atrypa - - - - - - 336
Athyris - - - - - - 336

	Page
Martinia	337
Stringocephalus	337
Family II. *Rhynchonellidæ*	338
Rhynchonella	338
Hemithyris	338
Camerophoria	339
Uncites	339
Pentamerus	340
Family III. — *Productidæ*	340
Productus	340
Strophalosia	340
Chonetes	341
Aulosteges	341
Leptæna	341
Davidsonia	342
Orthis	342
Orthisina	342
Strophomena	343
Calceola	343
Family IV. — *Craniadæ*	343
Crania	344
Family V. — *Discinidæ*	344
Discina	345
Siphonotreta	345
Trematis	345
Family VI. — *Lingulidæ*	346
Lingula	346
Obolus	346
Order III. — Rudistæ	347
Family I. — *Radiolitidæ*	347
Radiolites	347
Caprina	348
Family II. — *Hippuritidæ*	348
Hippurites	349
Family III. — *Caprotinadæ*	349
Caprotina	349
Caprinula	349
Caprinella	350
Explanation of Terms	351
Index	359

POPULAR CONCHOLOGY.

INTRODUCTORY CHAPTER.

The study of shells and their animal inhabitants, is one of the most interesting that can be pursued by a lover of Natural History. If he confine himself to their external appearance, and compare them with the other orders of creation, with reference to the beauties the shells alone present to the eye, he will find that they are inferior to none in form or colour, exhibiting the most exquisite contours, with the most varied and beautiful tints; if he pursue his examination further, and, without limiting himself to the exterior, fix his attention upon the living animal, as well as upon the inanimate shell in which it resides, and which it constructs itself, he will be amply repaid by the search. He will find the same harmony existing in all its relations, the same adaptation of means to the end required, the same fitness of the creature for the element in which it is to reside, and the mode of life it is to pursue, as he will trace in the more complicated and apparently more perfect classes of animals. Finally, should he enter into a more scrutinizing investigation, and make it his object to become acquainted with the physiology of the animal, apart from its shell, and to pursue its history from its production to its death, following its

gradual increase and advancement to its perfect state, including in his researches the formation of its shell, and the mode by which it receives enlargement and colour, he will here again find this study as interesting as that of any portion of the created kingdom.

Conchology* is the familiar term employed for this branch of Natural History, but, when connected also with that of the animals, the term Malacology is used. In pursuing this pleasing study, whether an extended or limited view be taken, it is necessary, in the first place, to know something generally of the animals, their growth, the mode by which they form their shells, their place of residence, and habits, before entering upon a minute and classified division. The present chapter will therefore have these objects in view.

The animals which inhabit and form shells are called *Mollusca*†, and, as their name signifies, have a soft body, most of them being entirely destitute of bones, though some are provided with internal shells, more or less perfectly formed; some species of slug, for instance, have internally a rudely shaped hard body, and others a mass of small grains. The cuttle fish also, of the class Cephalopoda, have an internal support in the form of a pen. To compensate for the apparent deficiency in this respect, and to enable them to provide themselves with a defence against any injury to which they might be liable from so delicate a structure, they have been furnished with an external skin or envelope, covering them more or less completely, and from which a liquid exudes, which, on exposure to the air or water, hardens into shell; thus

* From *conchylion*, Gr., or *concha*, Lat., *a shell*, and *logos*, Gr., *a discourse*.

† From *mollis*, Lat., *soft*, and *esca*, Lat., *flesh*.

most of them are enabled to cover themselves with a secure, and at the same time commodious and beautiful habitation, into which they can retire, by the aid of strong contractile muscles, far enough to escape from danger when it approaches. This outer skin is now usually called the *mantle*, and is common to most species of mollusca. As a considerable portion of these animals live entirely in the water, from which they derive their nutriment, and which they breathe by the aid of *branchiæ*, resembling the gills of fish, it is necessary that means should be provided for the admission of that fluid to the interior of the body, and, in order to effect this, certain openings occur in the mantle, through which the water passes and returns, and by which also the head and foot, when these parts exist, are put forth and drawn back at the will of the animal. In *univalves* this mantle is in the form of a sac, and has an opening in front; in *bivalves* it is divided into two lobes, one for each valve.

Mollusca do not all possess heads, one entire class being quite destitute; when they do exist, they are usually provided with *tentacula*, (as in the animal of the *Marginella*) (A A), by which the animals feel their way, and which they have the power of easily retracting when danger threatens; they have generally also eyes (B B), and other organs of sense, but they vary much in this respect, some possessing those of sight and smell, whilst others are devoid of both, and apparently enjoy only that of touch. That of feeling and sensibility to pain must be slight, or they could never survive the mutilations they sometimes undergo, and they have the power of reproducing parts that have been injured, or even cut off. That limb, which, from its being

Marginella.

an organ of motion, has been called the *foot* (c), is much more universally found amongst mollusca than the head, and is a member of considerable importance. It is very muscular and flexible; large and strong in Gasteropoda and in the burrowing kinds of Conchifera, and rough in those which bore into rocks, but scarcely existing in those attached to other substances. A few words only in this part of the work are necessary with regard to the internal construction of these animals. They possess the usual organs necessary for the support of life, a nervous system, a heart, with its attendant veins and arteries, furnished with a cold and white or bluish blood, and an apparatus for breathing, consisting, in those which live in water, of branchiæ placed externally or internally, and so arranged as to have a stream of water continually presented to them, and in those which live in air, of organs fit for its respiration.

Mollusca are to be found in all parts of the world, in the sea, in rivers, and on land, and differ in their construction and habits according to their locality. A great number have their residence in the sea, and are unable to exist out of salt water; of these some continue near the surface, others have the power of moving through the deep waters, and others again are attached by various means to rocks and corals. Many species are met with, living on the shore, in the sand, mud, or cliffs, and many in rivers: the land also has its peculiar varieties, where they live under ground, in holes of trees, or in moist and marshy places. These different habitations give a general name to the Mollusca which are found in them, as *Pelagic**, to those which reside in the deep recesses of the ocean, *Litoral*†, to such as are found on the coast, *Flu-*

* From *pelagus*, Lat., *the deep sea.*

† From *litus*, Lat., *the sea shore.*

*viatile**, to those which inhabit rivers, ponds, &c., and *Terrestrial*†, to the species which are met with on the land. The most active and energetic races live only in shallow water, or near the surface: those found in very deep water are the lowest in their instincts, and are especially organised for their situation.‡

The methods of *locomotion* adopted by those Mollusca which move from one place to another are very various. A great number, like the oyster, are perfectly stationary, and do not, when once fixed, move from the place they have selected: the greater number, however, are continually moving about, and various and beautiful are the contrivances by which they effect this. Some move along the surface of the ground or bottom of the sea, by means of their foot, which they thrust out to a distance in advance, and fix to some solid object, after effecting which, a strong muscular contraction enables them to draw their body to it; it is then again protruded in a similar manner, and by this means, the animal moves slowly: others, using an action the reverse of this, push backwards with the foot, and thus impel themselves forward; and others, still however making use of the foot for the purpose, contrive to advance with considerable agility, by coiling it up tightly, and suddenly relaxing it, by which means, serving as a spring, it urges the body to some distance. There are many species of Mollusca which are unable to move along the rough surface of the ground, but manage to advance rapidly enough on the smooth marine plants, by a kind of sliding motion. Those tribes which do not creep along the ground, but move through the water,

* From *fluvius*, Lat., *a river.*

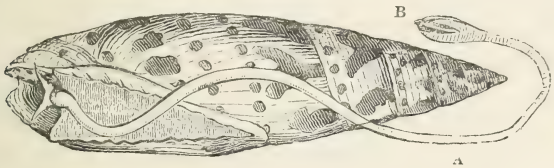
† From *terrestris*, Lat., *of the land.*

‡ Woodward's Recent and Fossil Shells.

have recourse to various methods to enable them to swim; some only float, borne as the winds and waves direct; a few can glide along the surface of the water, the body and shell hanging down below, the foot alone retaining them in this position; others, by squirting out suddenly a stream of water, which they have taken into their shells, send themselves forward in an opposite direction; and others swim, by using their foot as a fin, and moving it from one side to the other. In those Mollusca which affix themselves permanently to a submarine object, the method of attachment varies considerably; some, for instance, are fixed by the shell, some by a continuation of the foot either in a mass, or divided into separate fibres, some by a tube, and others by a number of threads, which they spin and fix to different parts of the rock or other substance on which they dwell; some excavate holes in soft rocks, and others in timber. In the locomotive Mollusca the foot is often serviceably employed for the purpose of burrowing in the sand and mud, to enable them to conceal themselves underneath, being used very effectively as a scoop, and thus enabling the animal to hide itself in a short time, and to emerge when all danger is over. The land Mollusca live mostly in moist places and woods, and glide about by the aid of the muscular foot.

With regard to the *food* on which Mollusca live, there is as much variety as exists among animals of a more complicated organisation: some are carnivorous, others herbiverous, and the substances on which they feed, whether animal or vegetable, are consumed by them in various states, some preferring the living, whilst others prefer the dead or putrescent form. To meet these different forms of nutrition, various and diversified organs are required: and it will be found that in these animals, as well as in the other ranks of creation, the appropriate

apparatus is adapted in every case. Amongst those which are *carnivorous*, some are furnished with appendages, by which they can capture their prey, as the Cephalopoda; others, that are fixed, by producing a slight current, obtain a constant stream of water supplied to their mouths, bringing with it minute animals, which they retain; as the oyster. The mouth of many is in the form of a proboscis (A) (which is unusually long in *Mitra episcopalis*),



Mitra episcopalis.

and is furnished with little hooks (B), with which they can penetrate the shells of those they feed on, and extract the contents by drilling a little round hole (often seen on shells, particularly bivalves), the inhabitants of which are thus entirely destroyed by their enemy. Those which are *herbivorous*, or have no proboscis, cut their food by the aid of a tongue, which is rough with recurved spines and teeth, and is really a very formidable apparatus. This, as seen by the aid of a good microscope, is a very curious object, being formed like a ribbon, with a row of jagged teeth in the centre, and frequently three rows of hooks on each side.

Molluscous animals are *oviparous*, producing their young from eggs in the same way as birds, although many of them do not, when they are deposited, abandon them at once, but place them for a time between the two membranes of the branchial laminæ, where they undergo a species of incubation. Mollusca are extremely prolific; it is stated that mussels produce 300,000 young in one

season, and the oyster not much less: fortunately land shells are less prolific. The eggs of land genera are separate, those of sea shells adhere together in masses.*

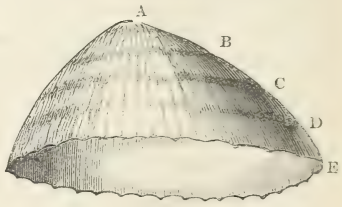
The following interesting account of the proceedings of the *Paludina impura* (Bithinia tentaculata *Gray*) is taken from Forbes and Hanley's work on British Mollusca, and will inform the reader of the method pursued by some of these curious creatures. "The *B. tentaculata* lays from May to August. There are usually from thirty to seventy globular, yellowish, hyaline eggs, which are united together in a band, and attached to stones or the stems of aquatic plants. When the animal desires to lay, it seeks some smooth place, and begins to clean the surface with its mouth before commencing. That being done, it contracts its foot, so as to render itself a third shorter than its usual dimensions when creeping, but also a third broader. Then ceasing to use its mouth, it raises the centre of the anterior extremity of its foot, so as to form a little canal intended to receive the egg. It next withdraws its head a little within the shell, and directs its muzzle towards the branchial orifice where an egg appears, which it seizes and guides into the little canal to fix it in its destined locality. Then the animal cleans the body to which it adheres anew, and deposits a second egg, repeating the operation, until at last all the eggs are expelled, and arranged in ribbon fashion, each band, when laid by an adult, consisting of three rows. The whole process proceeds slowly, time being left between each effort sufficient for the agglutination of the egg. The young ones emerge at the end of from twenty to twenty-five days, and do not attain full growth until the end of their second year."

* Woodward's Recent and Fossil Shells.

Having thus given a short general description of the animals inhabiting shells, the next object of inquiry is the formation of *shell* itself, which is composed of carbonate of lime (the mollusc obtaining this substance from its food—seaweeds, or other shells), and a small portion of animal matter. Forbes says, that those districts which are destitute of lime have also no shelled Mollusca. The mollusc has a small shell attached to it, even before the egg is hatched, and this is generally of a pale horn colour, destitute of markings, and almost transparent; when, therefore, it remains attached to the apex of the spire in adult shells, it may be easily distinguished by its appearance, from the additions made afterwards. As the animal increases in bulk, it finds the shell is not sufficiently large to cover it, and it then adds to its dimensions by the aid of its *mantle.* The animal, as before mentioned, has the power of causing a liquid matter to exude from this portion of its body, which is composed partly of membrane, and partly of carbonate of lime; this, on exposure to the air or water, becomes shell, and the mollusc makes the addition to its original habitation by protruding the mantle beyond the edge, and suffering it in that manner to remain exposed: in a short time it is found to be covered with a fluid which has been secreted, and this gradually and slowly assumes consistence, fresh layers being added within, each projecting a little farther at the edge, and thus the new formation becomes similar to the shell already in existence; by this means are formed what are called lines of growth. This operation is repeated at intervals, as the animal increases, so that by this beautiful contrivance the shell and its inhabitant are always adapted to each other, and preserve their relative proportions.

As the new portion of shell is always similar in shape, and, in fact, takes its form from that part of the mantle

which is pushed out, it is evident that the conformation of every shell will depend upon the manner in which the mollusc protrudes its mantle, and that it will be spiral, cup-shaped, or otherwise, according to circumstances. This can be best explained by a few references; thus, the simplest form of shell is that of the *Patella* or Limpet, which has a very small portion (represented at A in the figure) formed at the period of its birth; as it increases in size, and finds this inadequate to protect its body, it expands the border of its mantle, and, by degrees, enlarges its shell all round, until it presents the appearance of A B; in like manner, at different periods, as its growth requires, it enlarges to C, D, and E, at which time, having attained its full size, it ceases to require any farther enlargement, and the shell is then completed or mature.



Patella vulgata.

This presents the most simple method of growth, as in the Limpet the mantle is extended equally at every part of the circumference of the original shell, and the *size* merely is increased, still preserving the same shape; in the greater number of univalve shells, however, the method of enlargement is different, the mantle being more active on one side of the aperture than on the other: this gives rise to a *turbinated* or *spiral* shell, in which each successive portion of the spire, which forms an entire circle, is called a *whorl*. A shell (*Scalaria pretiosa*) of this nature is here shown. The new formations can generally easily be traced, and the ridges represented in this species consist of a thickened lip, which, at certain periods of its

Scalaria pretiosa.

growth, the animal has formed at the edge of the shell then existing. These spiral shells are almost always formed with the whorls turning towards the *right*, which arises from the *left* side of the mantle being the most active, in consequence of the position of the heart and blood-vessels of the animal on that side*: in a few genera, however, the heart is situated on the *right* side, and then the whorls of the shell are turned to the *left*, and the shells in which this conformation takes place are called *reversed*, or *sinistral*†, in opposition to the common, or *dextral*.‡

The growth of bivalve shells is carried on in the same way, each valve being simultaneously enlarged, as will be seen in the annexed figure, where the additions may be easily traced.

Mytilus edulis.

The power of forming shell does not appear to be confined to the *edge* of the mantle; but exists throughout its whole extent; this has been proved by breaking and removing part of the shell of a living snail, at a distance from the edge or lip: the animal immediately sets about filling up the gap, and effects it in the course of a few days

* Dr. Grant makes the following observations on this subject, in his *Lectures on Comparative Anatomy*, at the London University:— "I am inclined to ascribe this spiral twist of shells to the action of the heart and the respiratory organs, which are situated on the left side, and to the descent which the foot of the animal makes over the columella, in order to reach a solid surface to creep upon. The dilatation of the heart bends the anterior free part of the body to the right side, and would cause the shell to revolve on the same plane, were that cause to operate alone; but the constant descent of the foot over the surface of the pillar causes the plane of revolution to change at every instant, and by these two causes the spiral form of shells appears to be produced."

† From *sinister*, Lat., *left*.

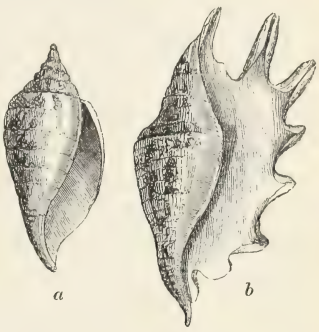
‡ From *dexter*, Lat., *right*.

by a succession of thin strata of liquid shelly matter, which exude from that portion of the mantle which has been laid bare.

Dr. Carpenter has given a most interesting account of the structure of shell as shown by the microscope. In some classes there is a prismatic formation of membrane, like honeycomb, the interstices filled with carbonate of lime; in others there is a membranous structure, consisting of alternate layers of membrane and carbonate of lime; these two modes of construction exist also in the same shell, the former being the external portion, and the other the internal; Dr. Carpenter describes other formations, all of which are highly curious.

The regularity in the growth of many shells appears to be interrupted at particular times by changes which arise in the shape of the mantle; this is observable in several species, which exhibit knobs or spines projecting from their surface, and which have been produced by the mantle altering its form, and dividing into thick or slender branches. On these processes are formed hollow spines, which are gradually filled up by successive depositions of shelly matter, and eventually become solid; the mantle, being then withdrawn from them, proceeds in the formation of new shell, branching out at regular intervals into another row of spines, knobs, or foliations; and in this manner are produced the prickles, ridges, and other excrescences visible in many genera, the *Murex*, for example. Analogous to these variations in the deposit of shell by the mantle, but differing, inasmuch as they only occur at one period, are the developements which take place when the mollusc has arrived at its full growth. In the adjoining cut are represented the immature and mature states of the same shell (*Pteroceras lambis*). It will be seen that they differ widely; and the variation has been caused by

the mantle of the animal forming the extension of shell with its accompanying projecting tubes, as a completion to the habitation: it marks the termination of the animal's labours, the shell is now become perfect, and, the mollusc having arrived at its full growth, the secretion of shell is no longer required to be called into action for the purpose of increasing the size of its habitation; and from this period the animal, if it continue to produce shell, only adds to the thickness and polish of its mansion, without extending its dimensions. The Cowrie also when young has a thin, sharp-lipped shell: in the adult, the lip is curled in, and very much thickened. Some land snails, too, have a thick lip only when the shell is arrived at full growth. Others have the power of dissolving the inner portions of the shell, when the body requires more space. "It should be added, that all shells whose spires are exposed (and, being thin in their young state, would be liable to be broken off by the action of the sea,) have that part strengthened by the internal deposition of shelly matter. Some few shells, however, as the *Bulimus decollatus*, for instance, lose the upper part of their spire; for the animal, instead of lining the upper whorls, withdraws its body from them, and forms a division: the communication of the body and the *apex* of the shell being cut off, the latter part decays in the manner of a dead shell, and falls off in particles."* Most shells have an outer coating called the *epidermis*, which serves to protect them

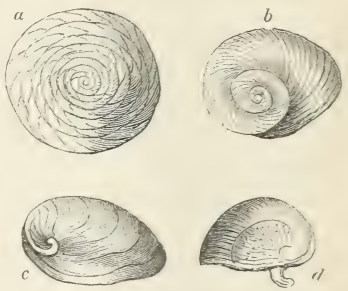


Pteroceras lambis.
a, immature. *b*, mature.

* Gray, Philosophical Trans. 1833.

from injury when the animals are alive, but it soon rubs off after death. It seems to be composed of animal matter alone.

Many of the turbinated or spiral-shelled Mollusca have the power of forming an additional protection to their bodies, by constructing a kind of door, called the *operculum**, or *epiphragma*†, to the entrance of their shell. These are made more or less strongly, as circumstances require; some, as the snail and other land species, merely needing this extra covering during severe weather, at the end of that time throw it off, and on a recurrence of the necessity make another; these being, therefore, of a temporary nature only, are slight and easily formed, but there are other genera which have them permanently attached, and of a more solid description‡: these latter are fixed to the *foot* of the animal, and are enlarged in size by the mollusc, as the shell is increased, in order that they may correspond with and close the aperture. They are found attached to the animal before the egg is hatched. In the foregoing figure are delineations of several varieties of *opercula*. Some are shelly, and others of a horny construction.



Opercula.
a, concentric. *b*, spiral. *c*, claw-shaped. *d*, articulated.

The beautiful and varied *colours* which shells present are produced by colouring matter contained in the pores,

* From *operculum*, Lat., *a cover* or *lid.*

† From *epiphragma*, Gr., *a stopper.*

‡ The temporary clausilia, or doors, are called *epiphragmata*, the permanent, *opercula.*

which exists in *the front part only* of the mantle, and which matter is made to penetrate the substance of the shell before it becomes hardened: the experiment before mentioned* will serve also to exemplify this. The portion of shell of which the animal has been deprived (and this may be done without injury to the Mollusc) will be reproduced by the action of the mantle, but the colours will be different according to the situation of the part of the shell which has been broken: if the piece be removed and reproduced *at the external lip* of the shell, where the front part of the mantle lies, the natural colours will appear in the new piece; but if the fracture has been made *at a distance from the aperture*, and in the body of the shell, a new portion will indeed be made by that part of the mantle which has been laid bare, but it will be white or nearly colourless; thus proving, that, although every part of the mantle can produce shell, *the external edge* alone can infuse colour into it. The brilliancy of the colours observed in shells is exceedingly influenced by the degree of health, and by the food, light, and heat which the mollusc has had the power of enjoying. Those which inhabit tropical countries have often a very great degree of brilliancy and beauty; whilst others, which are less favoured by climate, and, still more remarkably, those which remain all their lives enclosed in wood, chalk, &c., have little or no colour. It is observable, also, in a similar manner, that a great difference frequently exists in the *size* of mature shells of the same species, particularly in such as have the strongly marked lip, or other final appendage: this may be accounted for by the strength or weakness of constitution existing in different individuals, influenced undoubtedly by favourable or unfavourable situations, and abundance or

* See page 11.

scarcity of food. But this opinion can only be satisfactorily proved or disproved when shells are better known. Mr. Gray has the following remarks on the subject:— "The *thickness, roughness,* or *smoothness* of shells appears to depend in a great degree on the stillness or agitation of the water which they inhabit. Two specimens of the same species of shell will often be found very different in appearance, according to the situation in which they have been placed. For instance, the common *Buccinum* of our coast is thick, solid, and heavy, when found in a rough sea, and thin, light, and smooth, when found in the still water of harbours. Boring shells are generally influenced in regard to their size, thickness, and form, by the hardness or softness of the rock in which they are found. Land shells are much influenced, as regards their size, by the temperature, altitude, and abundance of food. The shells of *Helix nemoralis,* and *Helix hortensis* found near London, are not above two thirds of the size of those which occur in Portugal and the south of France."*

Of the *uses* and *benefits* derived by man from shells and their inhabitants, a hasty mention may be made. First, as to their *inhabitants;* amongst civilised nations many species are highly prized as articles of food, such as the *oyster, mussel,* &c.; and among savage nations, particularly those inhabiting the coasts of Western Africa and New Holland, a great part of their food is derived from Mollusca of various kinds. Their principal use, however, in this respect appears to be, the serving as food for the classes of animals more immediately above them in the scale of organization, such as the amphibious mammalia, sea-birds, and fish, which in a great measure live upon them, destroying such vast quantities, that it is their extraordinary

* Philosophical Trans. 1833.

fecundity alone which prevents them from being totally annihilated. A silky thread is produced by the *Pinna*, which may be spun, and is occasionally made into gloves, &c., but more as a curiosity than for any useful purpose; and from several species of Mollusca may be procured a strong colouring matter of a purple hue, which was formerly used as a dye, but has now been supplanted by other animal, mineral, and vegetable productions, which are easier of access. Secondly, as regards the uses of shells; in many countries, particularly in China and Japan, the valves of some of the genus *Placuna*, which are extremely thin and semi-transparent, are used instead of glass, for windows. Lime may be burned from a great many varieties, and is so procured in America and elsewhere, particularly in Holland, where many vessels are employed in fishing for shells, which are afterwards brought to Haarlem, where the lime-kilns are situated. In the Hebrides, Antilles, and many other islands, no other lime is known than that procured from shells. A species of *Strombus* at Martinique, the *Concholepas* in certain places on the coast of Peru, and a species of fossil oyster in Senegal, are burned for lime. Some shells are used as money in different countries, particularly the *Cypræa;* and in conclusion, pearls and mother of pearl, both the produce of this class of animals, are well known valuable and beautiful objects.

To counterbalance in some measure the benefits derived by mankind from Mollusca, there are some which are injurious, but to no very serious extent: snails and slugs do much damage in our gardens by their voracity; and many of the marine species, which make their residence in wood and stone beneath the surface of the sea, occasionally do us much damage, by boring into dikes, piers, and even ships.

The duration of life in the Mollusca is little known;

some are supposed to live but one year or season, others two, as the land snail. Again, others exist many years; and probably the ridges on the surface of many genera are the terminations of the yearly growth; but these are scarcely more than suppositions. Many of the bivalves attain their full growth in a year; the oyster in four or five. The *Tridacna*, and others of large size, must enjoy unusual longevity.*

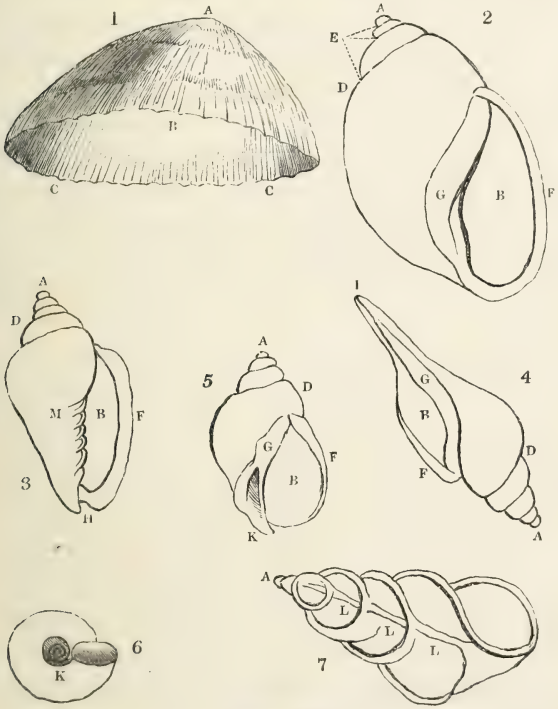
Having thus given an outline of the nature of *Mollusca*, or, in other words, of *shells and their inhabitants*, in order that a general idea may be formed of them, their classification and arrangement into different orders and genera may now be entered upon, so that the reader may have the power of becoming more particularly acquainted with them, and be able to decide upon the nature, habits, and peculiarities of any shell, and the mollusc which has resided in it, by a simple inspection of its form and appearance. It is rarely indeed that the *animal* is to be met with in collections, the shell only being retained as an object worthy of preservation.

The greater advance the reader makes in the study of Conchology, the more the interest and delight will increase. The beauty of form in some shells, the grotesque shapes of others, the exquisite colouring and marking of many, and the habits and peculiarities of the inhabitants of all, will excite wonder and admiration at the care which has been bestowed on creatures, of which thousands are never seen by the eye of man. The reflection will arise that they were formed by Him who has made nothing in vain, and that these, among the many exquisite productions of Nature, were created "for man to gaze on, wonder, and adore."

It will be advisable to give representations of a few dif-

* Woodward's Recent and Fossil Shells.

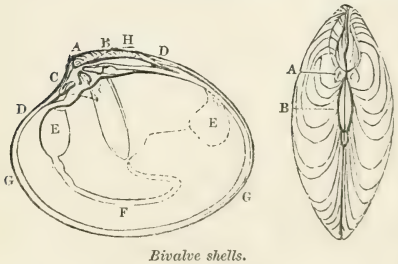
ferent kinds of shells, with a description of the parts constituting them, and the names by which they are known, as in giving an account of the variations which exist in the different genera many of these will be referred to. In fig. 1. is delineated the simplest form amongst univalves, that of a



Univalve shells.

Patella, in which the parts necessary for reference are but few. A is the *apex*, B the *mouth* or *aperture*, of which CC is the *margin*. The *exterior* and *interior* are sufficiently obvious. In figures 2. to 7., which are turbinated or spiral shells, and of a more complicated form, a greater number

of terms have been adopted to mark the variations which occur. A is the *apex*, B the *mouth* or *aperture*, which in fig 2. is *entire;* in fig. 3. *notched;* in fig. 4. *channelled.* D is the *spire*, formed of a greater or less number of *whorls*, the intersections of which, or where they wrap over, are called *sutures* E. F is the *right* or *outer lip;* G, the *left, inner,* or *columella lip;* H, in fig. 3., is the *notch;* I, in fig. 4., is the *channel* or *canal;* K, in figs. 5 and 6., the *umbilicus;* L, in fig. 7., is the *columella*, or *pillar*, which can only be seen when the shell is cut open; M are the *plaits* on the left lip of fig. 3. The lower part of the aperture of a shell is in reality the anterior or fore part, for it is there that the head of the animal protrudes; but it is generally called the base; the entire edge, when the lips are not separated by a notch or canal, is called the *peretreme.*



Bivalve shells.

The component parts of a bivalve shell will be understood by referring to the annexed representation, in which A A are the *bosses*, or prominences, which exist near B, the *hinge*, or juncture of the two valves; the latter are also kept together by strong muscles, which proceed from the animal itself, and are attached to each valve on the interior surface, where they leave a scar when removed. Under the bosses, and inside the valves, are the *teeth*, being little projections that lock into each other, and serve to keep the valves steady when closed; they are divided into *cardinal**, or principal

* From *cardo*, Lat., *a hinge.*

teeth, C; and *lateral**, or side teeth, D D. E E are the *muscular impressions*, and F the *pallial impression*, which marks the size of the animal, being formed by the border of the pallium or mantle. When there is a flexuous line or sinus in the pallial impression, it denotes that the animal had siphons which were contractile; sometimes a third scar is visible; this is the spot where the muscles of the foot were attached. G G are the *sides* of the shell, which is called an *equilateral* shell when they are equal in length, and *inequilateral* when they are unequal. H is the *ligament*, which is horny, and by its elasticity tends to keep open the valves. This is counteracted at the animal's pleasure, by the muscles attached within the shell. The ligament is sometimes internal, and sometimes external, or both at the same time.

Mollusca form two great divisions, *Univalves* and *Bivalves:* the first comprising all those, the shells of which are formed of one single piece, as the *snail;* and the latter, those which have shells consisting of two valves, or distinct pieces, as the *oyster*. Each of these is again divided into *classes* and *orders*, each order into *families*, each family into *genera*, and each genus into *species*. These will be described in succession, according to the systematic arrangement of Dr. Philippi †, extending as far as the different *genera:* the limits of this work, which is intended but as an introduction to the science, will not allow of a description of each *species*, and a mere dry list of their names would be uninteresting. Reference can easily be made by the reader, who has mastered the subject as far as it will be pursued here, to the many large and scientific works

* From *latus*, Lat., *a side*.

† Handbuch der Conchyliologie und Malacozoologie. Halle, 1853.

which have appeared, particularly those so beautifully illustrated by Reeve and Sowerby, in which each *specific* variety is introduced: that they would extend these remarks much beyond a short treatise, is evident from the circumstance that one genus alone, the *Helix*, or land snail, comprises nearly a thousand different species.

SYSTEMATIC ARRANGEMENT.

To face p. 23.

Classes.	Orders.	Families.	Genera.
CEPHALOPODA	DIBRANCHIATA	OCTOPODACEA	Polypus, Pinnoctopus, Moschites, Cirroteuthis, Argonauta.
		SEPIACEA	Cranchia, Loligopsis, Histioteuthis, Onychoteuthis, Ommastrephes, Loligo, Gonatus, Sepiola, Eledone, Sepioteuthis, Sepia, Teuthopsis, Leptoteuthis, Belemnoteuthis.
		BELEMNITACEA	Beloptera Conoteuthis, Belemnoteuthis, Belemnites.
	TETRABRANCHIATA	SPIRULACEA	Spirula, Spirulirostra.
		NAUTILACEA	Nautilus, Clymenia, Gyroceras, Lituites, Ascoceras, Cyrtoceras, Phragmoceras, Gomphoceras, Orthoceras, Trochoceras
		AMMONITACEA	Ammonites, Scaphites, Ptychoceras, Toxoceras, Baculites, Turrilites, Hamites.
GASTEROPODA	PECTINIBRANCHIA	STROMBACEA	Pteroceras, Strombus, Rostellaria, Dibaphus, Terebellum, Rostrotrema, Pterodonta, Spinigera.
		APORRHOIDEA	Aporrhais, Struthiolaria.
		CONEA	Conus.
		PLEUROTOMACEA	Pleurotoma, Perrona, Clavatula, Defrancia, Daphnella, Mangelia, Bela, Borsonia, Cithara.
		MURICEA	Fusus, Fasciolaria, Turbinella, Pleula, Cochlidium, Pyrula, Murex, Typhis, Triton, Ranella, Purpura, Concholepas, Leptoconchus, Purpuroidea, Monoceros, Ricinula, Engina, Columbella, Columbellina, Pollia, Pisania, Nassa, Dennosia, Cyllene, Buccinum, Bullia, Terebra, Cancellaria, Admete.
		CASSIDACEA	Cassis, Morio, Oniscia, Dolium, Eburna.
		VOLUTACEA	Voluta, Mitra.
		OLIVACEA	Oliva, Ancilla, Harpa.
		CYPRAEACEA	Cypræa, Erato, Ovula, Marginella.
		CORALLIOPHILACEA	Marsenia.
		TURRITELLACEA	Turritella, Proto, Murchisonia, Cerithium, Triforis
		PALUDINACEA	Paludina, Melania, Lithotia, Paxiaxis, Quoyia Helicopea Rissoa, Rissoina, Jeffreysia, Lacuna, Fossarus, Adeorbis, Skenea, Orbis, Assiminea, Litorina, Modulus, Risella, Solarium, Bifrontia, Valvata.
		SCALARIACEA	Scalaria.
		JANTHINACEA	Janthina.
		STYLINACEA	Stylina.
		NATICACEA	Natica, Cernina, Deshayesia, Sigaretus, Amauria, Lacuncula.
		VELUTINACEA	Velutina, Trichotropis, Cancellaria.
		NARICACEA	Narica, Neritopsis.
		XENOPHORACEA	Xenophora.
		CALYPTRAEACEA	Despotæa, Crucibulum, Mitularia, Trochita, Galerus, Crepidula, Capulus, Spiricella, Brocchia Pedicularia.
		RINGICULACEA	Ringicula, Pyrgostoma, Globiconcha.
		PYRAMIDELLACEA	Pyramidella, Odontostoma, Monopteroma, Turbonilla, Nerinea.
		EULIMACEA	Eulima, Sulcolites, Actis, Rissoella.
		VERMETACEA	Vermetus, Magilus, Siliquaria.
		COECACEA	Cœcum.
		SIPHONARIACEA	Siphonaria, Gadinia.
		ACMAEACEA	Acmæa, Lepeta, Jothea.
	SCUTIBRANCHIA	NERITACEA	Nerita, Navicella, Pileolus.
		TROCHACEA	Phasianella, Turbo, Liotia, Delphinula, Vitrinella Calcar, Astralium, Globulus, Trochus Enomphalus, Rhaphistoma, Scalites, Cyrtolites, Bankivia, Stomatia, Stomatella, Broderipia, Anatomus, Pleurotomaria, Trochotoma, Cirrus, Ditremaria, Hamotis.
		FISSURELLACEA	Emarginula, Scutus, Rimularia, Fissurella, Deridobranchus.
	CYCLOBRANCHIA	PATELLACEA	Patella, Carinaropsis.
		CHITONACEA	Chiton.
	CIRRIBRANCHIA	DENTALACEA	Dentalium, Cadulus.
	TECTIBRANCHIA	PLEUROBRANCHEA	Umbrella, Tylodina, Pleurobronchus, Pleurobranchæa, Posterobranchæa.
		APLYSIACEA	Aplysia, Icarus, Notarchus, Tephrocerus, Lobiger.
		BULLACEA	Aplustrium, Cylichna, Amphisphyra, Bullinula, Bulla, Atys Glauconella, Cryptophthalmus, Xanthonella Akera, Acera, Scaphander, Philine, Doridium, Gastropteron, Atlas, Oxynoë, Actæon, Ilbera, Actæonella, Volvaria, Cylindrites
	PULMONATA	ONCIDIACEA	Oncidium, Peronia, Onchidella, Buchanania, Onia.
		LIMACEA	Vaginulus, Incilaria, Limax, Philomycus, Geomalacus, Janella, Parmacella, Testacella, Pleurophorus.
		HELICEA	Daudebardia, Vitrina, Succinea, Helix, Anastoma, Tomigerus, Streptaxis, Proserpina, Bulimus, Achatinella, Achatina, Halia, Pupa, Cylindrella, Megaspira, Balea, Tornatellina, Clausilia, Lychnus.
		AURICULACEA	Scarabus, Auricula, Pedipes
		LIMNÆACEA	Chilina, Limnæa, Amphipeplea, Physa, Physopsis, Planorbis, Camptoceras, Ancylus.
		AMPHIBOLACEA	Amphibola.
		CYCLOSTOMACEA	Cyclostoma, Strophostoma, Pupina, Stoastoma, Helicina, Acme, Geomelania, Truncatella, Menestho.
		AMPULLARIACEA	Ampullaria
	NUDIBRANCHIA	DORIDIACEA	Doris, Villiersia, Hexabranchus, Atagema, Goniodoris, Brachychlanis, Triopa, Idalia, Ancula, Ægiris, Polycera, Thecacera, Plocamophorus, Ceratosoma.
		TRITONIACEA	Tritonia, Dendronotus, Doto, Duvaucelia, Scyllæa, Nerea Melibœa Tethys, Bornella.
		ÆOLIDIACEA	Glaucus, Æolis, Pterochilus, Calliopea, Tergipes, Genina, Lomanotus, Stiliger, Hermæa, Cloelia, Alderia, Proctonotus, Janus.
		PLACOBRANCHIACEA	Placobranchus, Elysia, Chalidis, Actæonina, Ictis, Fucicola, Dermatobranchus.
		PHYLLIDIACEA	Phyllidia, Hypobranchæa Pleurophyllidia.
	HETEROPODA	NUCLEOBRANCHIA	Carinaria, Cardiopoda, Cerophora, Pterotrachæa.
		ATLANTACEA	Atlanta, Oxygyrus, Bellerophon, Bucania, Porcellia.
		PHYLLIRHOACEA	Phillirhoe.
		SAGITTACEA	Sagitta, Sagittella.
PTEROPODA	THECOSOMATA	CAVOLINIACEA	Cavolinia, Clio, Balantium, Vaginella, Cresis, Theca, Conularia, Coleoprion, Pugiunculus, Triptera, Tentaculites
		CYMBULIACEA	Cymbulia, Eurybia, Peyche, Tiedemannia.
		LIMACINACEA	Limacina.
	GYMNOSOMATA	CLIONACEA	Clione, Clionella, Pelagia
		PNEUMODERMACEA	Pneumoderma, Spongiobranchæa, Trichocyclus.
		CYMODOCEACEA	Cymodocea.
CONCHIFERA	DIMYARIA	TELLINACEA	Venus, Artemis, Thetis, Cyprina, Donax, Amphichœna, Grateloupia, Tellina, Psammobia, Sanguinolaria, Capsa Mactra, Cardalia, Donacilla, Semele, Cumingia, Scrobicularia, Eryeina, Lutraria, Gastæa, Cyrena, Villorita, Cyclas, Pisidium, Cyrenoidea, Iphigenia, Crassinomine, Gnathodon.
		LITHOPHAGA	Saxicava, Petricola, Rupellaria, Clotho.
		ANATINACEA	Anatina, Periploma, Thracia, Magdala, Myodora, Pandora, Anatinella, Cochlodesma, Entodesma, Myochama.
		CORBULACEA	Corbula, Nucula, Poromya.
		MYACEA	Lutraria, Mya, Panopæa, Pholadomya, Allorisma, Edmondia, Glycymeris, Tellinomya, Arcinella.
		SOLENACEA	Solen, Psammosolen, Clavidophorus.
		PHOLADEA	Pholas, Jouannetia, Xylophaga, Teredo, Cyphus, Teredina.
		GASTROCHÆNACEA	Gastrochæna, Clavagella, Aspergillum
		CARDIACEA	Cardium, Protocardia, Conocardium, Isocardia, Goldfussia, Cardiomorpha.
		CHAMACEA	Chama, Diceras, Chamostrea.
		LUCINACEA	Lucina Fimbria, Diplodonta, Ungulina, Scacchia, Thyasira, Chironia, Kellya, Lasea, Lepton, Cyamium, Montacuta.
		GALEOMMACEA	Galeomma.
		ASTARTACEA	Astarte, Pronoë, Crassatella, Cardinia, Megalodon.
		CARDITACEA	Cardita, Trapezium, Opis, Myoconcha.
		SOLENOMYACEA	Solenomya.
	HETEROMYARIA	ARCACEA	Arca, Cucullæa, Scaphula, Orthonota, Pectunculus, Limopsis.
		NUCULACEA	Nucula, Nuculina, Leda, Yoldia, Malletia, Lyrodesma.
		TRIGONIACEA	Lyrodon, Schizodus.
		UNIONACEA	Unio, Paxyodon, Castalia, Monocondylæa, Margaritana, Anodonta, Iridina, Mycetopus.
		ÆTHERIACEA	Ætheria.
		MYTILACEA	Mytilus, Modiola, Modiolaria, Crenella, Lithophagus, Dreissenia, Mytilimeria, Byssanodonta, Modiolopsis Hippopodium
		PINNACEA	Pinna, Pinnigena.
		TRIDACNACEA	Tridacna, Hippopus.
	MONOMYARIA	MALLEACEA	Avicula, Pteria, Vulsella, Myalina, Ambonychia, Posidonomya, Malleus, Crenatula, Melina, Gervillia, Catillus, Inoceramus, Pulvinites, Pachymya.
		PECTINEA	Pedum, Lima, Limea, Pecten, Hinnites, Spondylus, Plicatula, Spondylus.
		OSTRACEA	Ostrea, Gryphæa, Exogyra, Carolia, Pododesmus, Placuna, Placunanomia, Anomia, Ænigma.
BRACHIOPODA	ANCYLOPODA	TEREBRATULIDÆ	Terebratula, Terebratella, Magas, Bouchardia, Terebratula, Gryphus, Terebratulina, Terebrirostra, Fissurirostra.
		THECIDEADÆ	Magathyris, Thecidium.
	HELICTOPODA	SPIRIFERIDÆ	Spirifer, Cyrtia, Atrypa, Athyris, Martinia, Strigocephalus.
		RHYNCHONELLIDÆ	Rhynchonella, Hemithyris, Camerophoria, Uncites, Pentamerus.
		PRODUCTIDÆ	Productus, Strophalosia, Chonetes, Aulosteges, Leptæna, Davidsonia, Orthis, Orthisina, Strophomena, Calceola.
		CRANIADÆ	Crania.
		DISCINIDÆ	Discina, Siphonotreta, Orbicella.
		LINGULIDÆ	Lingula, Obolus.
	RUDISTÆ	RADIOLITIDÆ	Radiolites, Caprina.
		HIPPURITIDÆ	Hippurites.
		CAPROTINADÆ	Caprotina, Caprinula, Caprinella.

UNIVALVES.

Class I. — CEPHALOPODA.

The Cephalopoda are decidedly the most perfect of the Molluscs; indeed, it may be asserted that in many respects, they are more highly organised than the least organised of the fish. The body is enclosed in a mantle, which is in the form of a sack; some kinds have a fin on each side, others either an inner or outer shell, which is always extremely symmetrical. The head is large, projecting from the mantle, and bearing arms or feet as organs of motion, arranged circularly round the mouth, whence the name of the order. The mouth is armed with two very strong, horny, partly calcareous jaws, which resemble the beak of a parrot: the tongue is beset with numerous microscopic, horny, barbed hooks, which are arranged lengthwise and across, in the same manner as those of many Gasteropoda. The crop is large and fleshy like that of a bird. The breathing apparatus lying within the body consists of one or two feathered gills on each side, and the heart lies between the gills, and is divided into three parts; so that, in speaking of the Cephalopoda, it is not incorrect to speak of three hearts. The eyes are very large and perfect, generally concealed by a skin, which becomes transparent at the place where it covers the eye; it sometimes forms folds which serve for eyelids. The organs of hearing con-

sist of a cavity which lies on each side near the brain; those of smell have not yet been settled with certainty.

The above simple description of the Cephalopoda is derived from Dr. Philippi's work; but, as he gives no information concerning the extraordinary apparatus with which the arms are beset, a concise account shall be given from Dr. Roget's Bridgewater Treatise. "These feet or arms, or tentacula, are long, slender, and flexible processes, exceedingly irritable, and contractile in every part, and provided with numerous muscles, which are capable of moving and twisting them in all directions with extraordinary quickness and precision. They are thus capable of being employed as instruments, not only of progressive motion, but also of prehension. For this latter purpose, they are in many species peculiarly well adapted, because, being perfectly flexible as well as highly muscular, they twine with ease round an object of any shape, and grasp it with prodigious force. In addition to these properties, they derive a remarkable power of adhesion to the surfaces of bodies, from their being furnished with numerous suckers* all along their inner sides. . . . So great is the force with which the tentacula of the cuttle fish adhere to bodies by means of this apparatus, that while their muscular fibres continue contracted, it is easier to tear away the substance of the limb than to release it from its attachments. Even in the dead animal I have found that the suckers retain considerable power of adhesion to any smooth surface to which they may be applied."

It will be seen in the following descriptions of the genera composing this order, that these arms differ greatly, but all are covered with formidable suckers.

The inky fluid, which some of these creatures have the

* These act almost like cupping glasses.

power of discharging from their bodies when danger approaches, is another curious provision for their safety; by its means they discolour the water around them, and thus elude their enemies, probably immediately after the discharge, darting off in a contrary direction with great speed. The animals of the genus Nautilus do not seem to possess this wonderful resource in times of danger, as they can retire into their strong shelly covering. "The deep brown colour, *sepia*, and the darker pigment, *Indian ink*, are the prepared fluid of the ink bags of different species of cuttle fish; a similar substance, secreted by extinct naked Cephalopoda, is found in a fossil state." (Mantell.)

The Cephalopoda are divided into two great orders — Dibranchiata — the animals of which have two branchia; and Tectibranchiata—the branchia being four.

Order I.

DIBRANCHIATA. (Owen.)

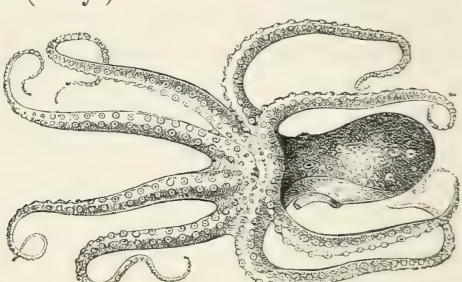
The animals of this order have two branchia (whence the name), large immovable eyes, eight or ten arms covered on the inner side with suckers, which sometimes have the character of claws; a thick and fleshy mantle, having but one opening; an ink bag and the sides of the funnel or vent tube entire; from this tube they can forcibly eject the water which has served the purposes of respiration; this is effected by a contraction of the body, giving them, at the same time, a powerful backward movement.

Section I. — Octopoda.

The animals have the eight arms arranged round the mouth, and beset with suckers.

Family 1. — *OCTOPODA.*

Polypus. *Schneider.* (Octopus *Cuvier.*) — *Shell* none. *Animal* with two rows of suckers on the arms, which are very long in proportion to the body, and connected at the base by a cuticle; the suckers are placed alternately in two rows; no fins; the oval mantle contains only two small horny granules, one on each side of the back, which are the rudiments of an inner shell. The eyes are proportionally small, and the animal has the power of covering them with a skin: the ink bag is within the liver. 46 species. (Gray.)



Polypus vulgaris.

Cuttle fish (the common name for these Mollusca) are found in all seas, and in Italy and India are used as food. In size they differ from an inch to two feet in length. They are very active and voracious, and not easily caught; when alarmed they discolour the water around them by means of their ink, and so elude their enemies; the eggs are transparent, and attached to sea-weeds. Dr. Grant remarks that the *Polypus vulgaris* has about 240 suckers on each arm, making about 1920 in all. The arms of these creatures, which travellers affirm are sometimes two feet in length, are covered with for-

midable suckers, which make them very powerful instruments; and fish and other victims, when once within their clutch, would find it impossible to escape.

PINNOCTOPUS. *D'Orb.* — *Shell* none. *Animal* having the body with side fins, joined behind; arms very long, suckers in two rows, but small, and the arms joined by a broad web at the base. 1 species.

P. cordiformis: a native of the seas of New Zealand, is the only species known.

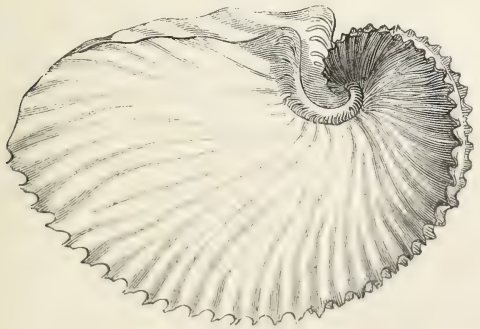
MOSCHITES. *Schneider.* (Eledone *Leach.*) — *Animal* like Polypus; but the arms have only one row of suckers. —27 species.

Found in European seas, and emitting a musky smell.

CIRROTEUTHIS. *Eschricht.* — *Shell,* an inner cartilage. *Animal* with two transverse fins on the body; arms almost united to the tips by a cuticle, and having one row of suckers, with cirri alternately.—1 species.

C. Mulleri is found on the coast of Greenland.

ARGONAUTA. *Lin.* *Shell* monothalamous (one-cham-



Argonauta Argo.

bered), symmetrical, external, elastic, very thin, and containing the body of the animal; spire doubly keeled,

tuberculated, and curved back into the aperture. *Animal*, body globose, having eight tentacula, two of which are thin and dilated, all having two rows of suckers. Eyes very large, ovate, prominent, and covered on the upper edge with a thin eyelid.—6 species: also fossil.

The curious and beautiful shells of the *Argonauta Argo*, or Paper Nautilus, are found in the seas of warm latitudes, particularly those of the Mediterranean, New Holland, the Cape of Good Hope, and, Mr. Cumming remarks, of South America.

An interesting series of experiments was made a few years ago by Madame Power, for the purpose of ascertaining the nature and habits of the Argonauta, about which much controversy had existed, as to whether the mollusc found in the shell also constructed it — this had been long doubted; but the question has been set at rest by her observations, and those of others, who have lately studied the subject. This lady, who was residing at Messina, had a kind of case constructed in the sea on the coast, and enclosed in it several of the living animals, which she kept supplied with their natural food, consisting of small molluscs. She had them of all sizes, from the small naked octopod just issued from the egg, to those full grown. Her observations proved that, after twelve days, the two frontal arms of the young animal became dilated at the extremity, and that they then commenced forming the thin delicate shell; that the animal is not, or but slightly attached to the shell, though when under water it adheres firmly to it by these dilated arms, which are turned over and affixed to the outside, entirely covering it. The shell, which is remarkably brittle when exposed to the air, is perfectly pliable in water, and is thus enabled to escape the destruction which would otherwise appear likely to be met with by so thin and tender a fabric.

That these creatures repair their shells as well as form them, is shown in the following interesting extract from Silliman's Journal for July, 1848: — "In the collection of shells in the cabinet of Amhurst College is an individual of the *Argonauta Argo*, which appears to furnish an additional argument in support of the opinions which are based on the researches of Madame Power. In this shell, a portion has been broken out near the middle of the left side, and not far from the sinus of the aperture. The opening was of a semilunar form, about $1\frac{3}{4}$ inch long, with an average breadth of half an inch. A new deposit of testaceous substance, together with a broken fragment, has closed the opening in the rude manner common in the shells of mollusca. But the most extraordinary circumstance is this; that a fragment which was broken out in the accident which befel the animal, now constitutes two-thirds of the repaired portion; and that the originally inner surface is now the outer surface, as is evident from its concavity, style of undulation, and texture. It is also nearly at right angles to its original position. These facts show that the piece was totally detached from the shell by the accident. We apprehend that such a case could scarcely occur, especially in a shell moving in the water, except in consequence of the functions now ascribed to the vela of the Argonaut. These once reputed sails, performing the less poetic function of clasping and enveloping the shell, prevented the loss of the large fragment. It is obvious, also, that the new deposit of testaceous matter was secreted from the part of the animal within the shell, and not from the vela, since the edges of the original shell around the fracture appear exclusively on the outside. Since none but the original inhabitant could repair it, the case described is corroborative of the opinion, that the animal usually seen in these shells is the original owner."

Professor Owen supposes the dilated arms are employed in secreting the shell; but this does not agree with the opinion of the American writer quoted above.

The animal of the Argonauta during life, and when unconscious of being observed, is very beautiful, the arms and other visible parts presenting the most lively colours —purple, gold, and silver. At the approach of any object, it takes in its arms, wraps those which are dilated over the shell, and descends, blackening the water at the same time, if hard pressed, by a discharge of ink, to cover its escape. During the experiments referred to, the animals seemed very shy, and would descend on the approach of any person, except when hungry, at which time they would take food from the hands of Madame Power.

Mr. Reeve remarks that the arms are not expanded aloft to catch the breeze, as represented by many of our poets; and that he had been told by the Rev. L. B. Larking, who had collected twelve hundred specimens at Messina, that he had *never* seen one *floating* on the sea; their natural locality being the deep water. Some of the species have no shell; the others are *A. Argo*, *nodosa*, and *hians*.

Section II. — Decapoda.

The animals possess ten arms, two of which are elongated, cylindrical, and dilated at the ends; these are called tentacula; they are all armed with suckers: those on the dilated portions are occasionally like hooks or claws; the body has two fins. In the middle of the back is always found an inner shell, which is either a horny pen or a shelly bone.

Family 2. — *SEPIACEA.*

The genera of this family have a perfect inner shell, sometimes horny, at others shelly, and cellulose, never chambered, so as to receive the body of the animal.

Cranchia. *Leach.* — *Shell,* a slender pen, as long as the body, and pointed. *Animal* having the body large, ventricose; fins small, and near each other; head small; arms short, suckers in two rows; the tentacula long; eyes covered by a skin. — 2 species.

Found in the Atlantic.

Loligopsis. *Lam.* (Leachia *Lesueur,* Perothis *Esch.*) — *Shell,* a slender pen. *Animal,* body elongated, with two fins; arms short, with two rows of suckers; tentacula very long and slender; eyes naked, and wide open: the funnel has no valve. — 8 species.

Found in deep waters in the temperate and tropic seas.

Histioteuthis. *D'Orb.* — *Shell,* a short horny pen. *Animal,* body short, the head well defined; six of the arms connected by a deep web, lower pair free; tentacula long, and with six rows of suckers on the dilated ends. — 2 species.

Found in the Mediterranean.

Onychoteuthis. *Lichtenstein.* — *Shell,* a narrow, elongated, horny pen. *Animal,* body long, with two fins; arms short, with two rows of suckers; tentacula long, and the dilated ends armed with several rows of hooks and suckers; eyes naked. — 6 species.

Found in the Atlantic and Indian seas. Philippi mentions the following as subgenera; Enoploteuthis *D'Orb.*, Ancistrocheirus *Gray,* Abralia *Gray,* Octopoteuthis *Rüppel,* Acanthoteuthis *Wagner,* Ancistroteuthis *Gray,* Onychia *Lesueur.*

Ommastrephes. *D'Orb.* — *Shell*, a pen, which is horny, slender, curved, and with three diverging ribs. *Animal*, body cylindrical, pointed, with large broad fins at the end; arms with two rows of suckers; tentacula with four rows; eyes naked. — 14 species.

These animals abound in most seas, where they are preyed upon both by fish and large birds. They often leap out of the water like the flying fish. Some are very large, as much as four feet long; their eggs are seen in long bunches. The fishermen give them the name of Flying Squids.

Loligo. *Schneider.* (Pteroteuthis *Blainv.*) — *Shell* horny, thin, transparent, of variable pen-like forms, with a channel in the middle. *Animal*, body long, fins triangular, terminal; the eight arms have the suckers in two rows, the connecting skin is covered with hollows; two tentacula with four or more rows of suckers on the dilated ends; eyes large.—21 species.

Loligo vulgaris.

Common on our coasts, and in most seas. These creatures are frequently called Calamaries, or Squids, by fishermen who use them as a bait; they spawn on the coast, and then retire into deep water; the eggs are placed in two rows, connected together by strings, in masses three feet long, and attached to stones. The pen is found in the fossil state at Lyme Regis.

Gonatus. *Gray.* — *Shell*, a pen like that of *Loligo*. *Animal*, the arms with four rows of cups or suckers; the tentacula have at the ends many small cups or suckers, with a large one in the middle armed with a hook; body

cylindrical, fins posterior and large; eyes large, and covered with a skin having a small transparent spot.— 1 species.

Found in the Greenland seas.

SEPIOLA. *Schneider.* — *Shell,* a pen shorter than the body. *Animal,* the body short and round, in the middle of which the round fins are placed; arms short, four rows of suckers on the tentacula, which are retractile; eyes covered. — 6 species.

Found in the Atlantic, Indian, and Australian seas, and considered in many places good for food. Philippi has the following as sub-genera: — Rossia *Owen;* Heteroteuthis *Gray;* and Sepioloidea *D'Orb.*

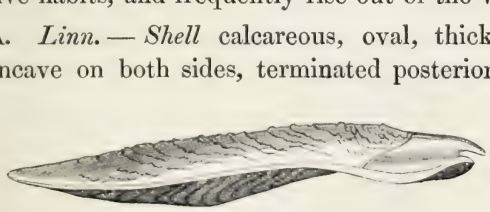
FIDENAS. *Gray.* — *Shell* very imperfectly known. *Animal,* the body oblong, rounded behind; fins oblong, on the sides of the back; head moderate, eyes large; arms elongated, tapering, free, except the third and fourth pair, which are united by a web: suckers very small, in two rows; tentacula doubtful. (Gray.) — 1 species.

One specimen brought in spirits from Singapore.

SEPIOTEUTHIS. *Blainville.* (Chondrosepia *Leuckart.*) — *Shell,* a horny pen with a central keel. *Animal,* body cylindrical, fins as long as the body, arms with suckers in two rows, eyes covered. — 13 species.

The animals inhabit the seas of warm climates, are of very active habits, and frequently rise out of the water.

SEPIA. *Linn.* — *Shell* calcareous, oval, thick; back hard, concave on both sides, terminated posteriorly by a



Sepia officinalis.

point; cavity filled with laminæ, separated by numerous cells. *Animal*, with an oblong body, the fins as long as itself; suckers in four rows on the arms. — 30 species; also fossil.

The shell of the *Sepia officinalis* (cuttle-fish) is used for making pounce and tooth-powder; the substance is composed of numerous testaceous laminæ, separated from each other by a perpendicularly fibrous calcified tissue, exhibiting a shining white and satiny lustre.

Brought principally from India, though found on our coast and the Mediterranean. Mr. F. D. Bennet states that the cuttle-fish is considered a luxury by all classes of the Sandwich Islanders, and that when fresh and well cooked it is excellent, being in consistence and flavour not unlike the flesh of a lobster's claw.*

There are some very extraordinary accounts given of the supposed size and power of these mollusca by De Montford, in Buffon's Histoire Naturelle, but, though exceedingly amusing, their accuracy is now doubtful. Some are described as large enough to draw down men-of-war at sea, and completely destroy them. But this is an exaggeration no doubt, though there are some species that grow to a very large size. Mr. Swainson remarks in his *Malacology* that he saw many caught on the shores of Sicily, and that two would be a heavy load, their arms being as thick as those of a man.

Teuthopsis. *Deslongchamps.* — *Shell*, a pen, like that of Loligo, but dilated and spatulate, with a narrow mid rib. — 5 species, fossil.

Leptoteuthis. *Meyer.* — *Shell*, a pen, very broad in front, pointed behind, with obscure diverging ribs. — 1 species. *L. gigas.*

* Narrative of a Whaling Voyage round the World.

BELOTEUTHIS. *Münster.* — *Shell,* a horny pen, which is lanceolate, the shaft broad, pointed at each end, and having small furrows on the under side. — 1 species, fossil. *B. subcostata.*

Family 3. — *BELEMNITACEA.*

This division of Cephalopoda is only known in the fossil state. The shell consists of a pen, having a many chambered cone, straight, and with a siphuncle lying close to the ventral side; the outside is usually marked by concentric lines of growth. — All fossil.

BELOPTERA. *Deshayes.* — *Shell* calcareous, conical, straight, or slightly curved, chambered, with a siphuncle on the edge; external sheath elongate, rather cylindrical in front, and sometimes winged on the sides, ending in a blunt beak at the hinder end. — 3 species, fossil. (Gray.)

CONOTEUTHIS. *D'Orb.* — *Shell* cone-shaped, broad, rapidly enlarging, thin, horny, and smooth, marked with very slight, rather oblique, concentric lines of growth, not covered with any calcareous coat; septa transverse, smooth. — 1 species, fossil. (Gray.)

Conoteuthis Dupiniata.

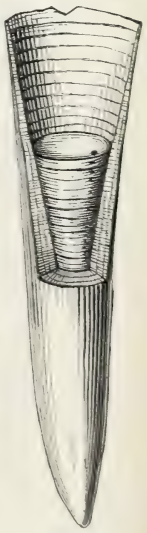
BELEMNOTEUTHIS. *Pearce.* (Belemnites *Owen;* Belemnosepia *Desh.*) — *Shell* internal, conical, thin, cylindrical, apex conical, chambered; septa concave; siphuncle near the edge. "*Animal* provided with arms and tentacula of nearly equal length, furnished with a double alternating series of horny hooks, from 20 to 40 pairs on each arm; mantle free all round; fins large." (Woodward.) — 1 species, fossil. (Gray.)

At Chippenham specimens have been found preserved,

with the muscular mantle, fins, ink-bag, funnel, eyes, and tentacles with their horny hooks.

BELEMNITES. *Lister.* — *Shell* straight, consisting of two parts; external, a sheath having a conical cavity at the larger end, and containing an inner cone, which is chambered and perforated. *Animal,* from the remains discovered, supposed to have resembled the Sepia in general characters: the shell or pen being internal, the body long, the fins two, the arms eight, covered with suckers; the ink-bag lodged in the horny expansion of the shell: the latter has been found nearly a foot in length. (Buckland.) — About 100 species, fossil.

These curious fossils vary in size and form; some are small, delicate, transparent, like amber; others are opaque, and from ten to twelve inches in length; some are cylindrical, or broad and flat, or even fusiform. They are very common, having been met with in all ages and countries, and giving rise to much speculation as to their real character. It is but recently that their true origin has been discovered, and their place in creation ascertained. In former times they have been described as petrified fingers or arrows, devil's fingers, spectre candles, fairy bolts, thunder stones, stalactites, or the teeth of some animal. The chambered portion is called the phragmocone, and is composed of cells formed by concentric divisions of a pearly substance, pierced by a siphuncle. This part is enveloped in a sheath of calcareous matter, passing upwards into a horny receptacle, which contains the ink-bag, &c.

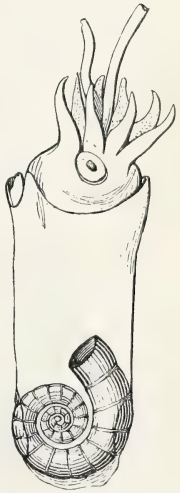


Belemnites.

Family 4. — *SPIRULACEA.*

The *shells* of this family are spiral, the whorls not touching: they are many chambered.

SPIRULA. *Lam.* — *Shell* cylindrical, thin, and almost transparent; partially spiral, the whorls not touching each other; partitioned into chambers by concave septa, and perforated by a siphuncle, which is on the inner side; it contains the ink-bag. *Animal*, body oblong, with ten arms, two of which are longer than the others, with six rows of minute suckers; the mantle nearly conceals the shell. — 3 species, recent.



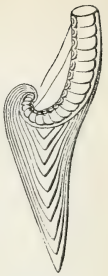
Spirula lævis.

The *Spirula Peronii* is a beautiful little shell, thin, fragile, and of a pearly white; its very elegant spiral form renders it one of the most exquisite amongst the many lovely shells we possess. In New Zealand and New Holland it is very abundant. Dr. Hooker says he saw thousands of the shells scattered about on the shore at Paroah Bay, New Zealand.* It has been picked up on the Irish coast, supposed to have floated from the West Indies; but the animal was not alive.

SPIRULIROSTRA. *D'Orb.* — *Shell* calcareous, internal, and ending in a thick, conical, very pointed beak; the upper part concave, and before the concavity rises a blunt,

* Reeve.

wrinkled knob; the chambered portion is somewhat spirally curved, describing a half circle; the partitions are at regular distances, and have a ventral siphuncle. — 1 species, fossil.



Spirulirostra Bellardii.

This remarkable genus is manifestly connected, by means of the spirally curved shell and the ventral siphuncle, to the *Spirula*, but resembles, on the other hand, the *Beloptera* very strongly.

Order II.

TETRABRANCHIATA. (Owen.)

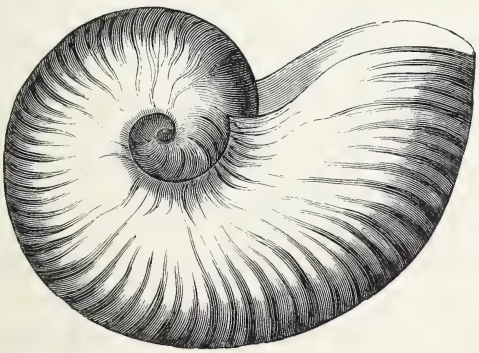
The animals of this order have four branchiæ (whence the name); the eyes are pedunculated, and large; arms very numerous; body attached to the shell by muscles; mandibles shelly, and like a beak. *Shell* external, chambered, and pearly, the animal only occupying the last chamber, which is very large; a siphuncle runs through the chambers from the first to the last. This order has but one *recent* genus, Nautilus; the rest are only found in the fossil state, and they must have existed in immense numbers in ancient seas, for it is stated that there are as many as 1,400 species belonging to this order.

Family 1. — *NAUTILACEA.*

The shells contained in this family have the siphuncle never entirely dorsal, or only apparently so; the partitions to the chambers are simple, rarely zigzag, lobed or foliated. They are all fossil with the exception of the genus Nau-

tilus, which has a living representative as well as many fossil species.

NAUTILUS. *Lin.*—*Shell* compressed, convoluted, whorls contiguous, the last enveloping the others; chambers numerous, from 30 to 40, formed by transverse, convex partitions, and perforated by a central siphuncle; inner surface pearly; outer dull, with chesnut brown marks. *Animal* attached to the shell by two muscles; tentacula numerous (Owen remarks that there are ninety); no arms or suckers, and no ink-bladder; a pair of large eyes, and a large leather hood, which serves as a covering.—2 species: also about 100 fossil species.



Nautilus Pompilius.

These shells, with their remarkable inhabitants, are found in the seas of warm latitudes, especially those of Africa, Asia, with its islands, and Australia. They are curiously divided by partitions into between thirty and forty chambers, the animal living in the last, but connected, by a flexible membrane running through the siphuncle, with the whole of the chambers. "This series of air chambers constitutes an apparatus which renders the Nautilus

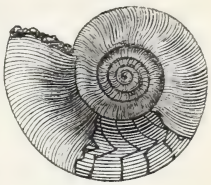
nearly of the same specific gravity as the surrounding water, and enables it to rise to the surface of the sea, or sink to the bottom, simply by altering the extent of the surface exposed to the water by its soft parts."* They usually remain in the depths of the sea, and are able to creep along rather quickly, supporting themselves upon their tentacula, with the head downwards, and the shell raised above; they often get into the fishermen's nets when thus moving about at the bottom of the sea. After stormy weather, as it becomes more calm, they may be observed in great numbers, floating upon the surface of the waves, with the head put out, and the tentacula resting upon the water, the shell at the same time being undermost; they do not, in a general way, remain long floating in this manner, and have the power of easily returning to their favourite situation at the bottom of the sea, by merely drawing in their tentacula and upsetting the shell, which immediately sinks with them. It was only in 1829 that this animal was known with any certainty, one having been caught alive, by Mr. G. Bennett, near the New Hebrides Islands; the animal, after drawings were made of it, was preserved in spirits, and is now in the museum of the College of Surgeons.

"Certain it is that the Nautilus, in its floating position, has neither arms capable of rowing, nor membranes adapted for sailing,"† as so often described by the poets.

The ancients fabricated drinking-cups of the shells of the *Nautilus Pompilius*; another species, *N. umbilicatus*, is very rare, and is distinguished by a large umbilicus on each side; those found in a fossil state are of various sizes; most of them beautifully represented in "Sowerby's Mineral Conchology."

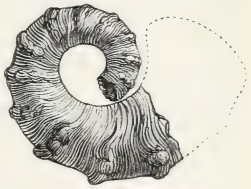
* Mantell. † Reeve.

CLYMENIA. *Münster.* (Planulites *Münst.*) — *Shell* separated from Nautilus by the partitions being slightly lobed, generally only one lobe on each side; sometimes they are angularly foliated, but not toothed; the siphuncle is very small, and always passes near the inner edge of the partitions; the back is rounded and the umbilicus remote, so that all the sutures are seen on each side. — 43 species, fossil.



Clymenia striata.

GYROCERAS. *Meyer.* — *Shell* many-chambered, rolled on a plane, regularly spiral, but the whorls not touching each other; the partitions are regular, with simple symmetrical edges; the last chamber is very large, at least forming the third part of the last whorl; the siphuncle is very thin, connected and sub-dorsal; the mouth is oval, sometimes angular. — 17 species, fossil. Woodward says the siphuncle is radiated.



Gyroceras eiteliense.

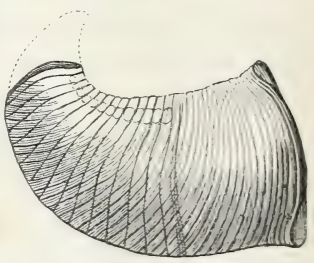
LITUITES. *Breyn.* — *Shell* many-chambered, at first spiral, rolled on a plane, the whorls either touching or free, the last chamber large and produced in a straight line; the partitions stand obliquely, having simple edges, and a ventral siphuncle; the mouth orbicular, simple, or with notched edges. — About 15 species, fossil.

Trocholites *Hall,* Philippi mentions as a sub-genus.

ASCOCERAS. *Barrande.* (Cryptoceras *Barr.*) — This new genus of the Nautilacea was made on account of the peculiar situation of the chambers; they are not perpendicular to the axis of the shell, but almost parallel to it; and the chambered portion of the shell embraces that part which is not chambered. — 5 species, fossil.

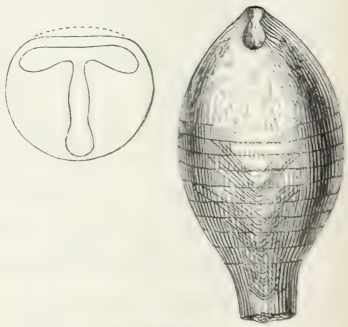
Cyrtoceras. *Goldfuss.* (Campulites *Desh.*) — *Shell* many-chambered, but in form resembling a curved horn, never rolled up; the partitions oblique, with simple edges; the siphuncle somewhat sub-dorsal, sometimes central, at others near the under side; the mouth usually oval, with the front and back compressed together. — 36 species, fossil.

Phragmoceras. *Broderip.* — *Shell* many-chambered; laterally compressed; curved, but having no spiral part; the partitions simple, with a large sub-ventral radiated siphuncle; the last chamber very large; mouth narrow, longitudinal, wedge-shaped, of which the hinder end extends into a broad oblique sinus. — 8 species, fossil.



Phragmoceras ventricosum

Gomphoceras. *Münster.* — *Shell* straight, short, almost egg-shaped, many-chambered, and enlarged in front into the egg-shaped, almost spindle-formed, last chamber, which receives the entire animal; the mouth contracted in the middle, almost triangular, formed of three lobes; the partitions oblique, numerous, simple, with a small, almost central bead-shaped siphuncle. — 10 species, fossil.



Gomphoceras pyriforme.

Orthoceras. *Breyn.* — *Shell* many-chambered, in form of a more or less gradually slender cone: the par-

titions oblique, and on the upper side concave; the last chamber large, and able, probably, to contain the whole of the animal: a central siphuncle. — Above 200 species, of various sizes, fossil.

Probably the substance of all these shells is, like that of the Nautilus and others, formed of a double shelly layer, of which the outer falls off. Philippi says one has been found ten feet long. *O. gigantea* is said by Sowerby to be eight feet in length, the aperture being eight or more inches in diameter, and diminishing at the rate of an inch in a foot.* This magnificent species is found in the mountain limestone of England and Scotland. Dr. Mantell relates that he picked up a fine fragment of one on the beach at Brighton, probably brought by a vessel as ballast, indicating as great a magnitude as the above. The siphuncle is dilated between each partition into a globular form. *O. cordiformis* also has "the siphuncle, composed of a series of hollow globes."†

Orthoceras.

Philippi mentions the following as sub-genera: — Gonioceras *Hall;* Mellea *Fisch.* and *Waldh.;* Endoceras *Hall;* Cameroceras *Conrad;* Conoceras *Bronn.;* Bactrites *Sandberger.*

Trochoceras. *Barrande.* — *Shell* many-chambered, unsymmetrical, rolled up like the Turrilites in the family Ammonitacea; the partitions simple, nearly like those of the Nautilus or Orthoceras. — 16 species, fossil.

A perfect description cannot be given until more specimens have been discovered. Woodward says that some of the species are nearly flat.

* Mineral Conchology. † Ibid.

Family 2. — *AMMONITACEA.*

The shells composing this family have very much the same structure as the Nautilacea, but the aperture has processes, and the partitions are lobed or foliated; the siphuncle is dorsal. — All fossils.

Ammonites. *Breyn.* — *Shell* discoid, spiral: whorls contiguous, and often all apparent; inner surface (the exterior covering has generally disappeared) marked by the sinuous partitions, which are transverse and deeply lobed or cut; siphuncle either on the margin or towards the back: last chamber occupying more than half, or the whole of the last whorl of the spire. — Between 500 and 600 species, fossil.

Ammonites.

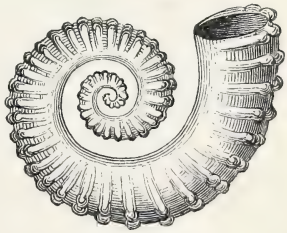
These shells are all fossil, and are from half an inch to two feet or more in diameter. Dr. Buckland speaks of some found in the chalk near Margate which exceeded four feet in diameter. They occur in many parts of the world. Dr. Gerard found them in the Himalaya Mountains, at an elevation of 16,000 feet: M. Ménard met with them in the Alps. Their numbers must have been very great in former ages: M. Dufresne informed Lamarck that the road from Auxerre to Avalon, in Burgundy, was absolutely paved with them; and it is no uncommon thing to find them used in some parts of Oxfordshire, Somersetshire, Gloucestershire, and Yorkshire, to pave the roads. They are commonly called snake-stones, and are supposed by the unlearned to be petrified snakes. In some the shell seems to have been as thin as that of the Paper Nautilus. Sowerby describes and illustrates in his "Mineral Conchology" many very interesting species, some in so perfect a state that they preserve their bright iridescent colours.

This genus has been divided into sections, according to the peculiar forms of the partitions. Philippi mentions Goniatites and Ceratites of De Hann as sub-genera.

Scaphites. *Parkinson.* — *Shell* many-chambered, symmetrical, egg-shaped, the beginning perfectly spiral, the whorls touching, excepting the last, which, formed by the last chamber, and free from the spire, stands straight out and then curves itself backwards, so that the mouth is opposite to the spire; the mouth entire, drawn together, and by an inner thickening still more contracted; the partitions sinuated like the Ammonites, and the lobes correspond to each other. The siphuncle is dorsal. — 17 species, fossil.

Scaphites æqualis.

Crioceras. *Léveillé.* (Tropæum *Sow.*) — *Shell* many-chambered, orbicular, symmetrical; the spire in all stages regular, the whorls free, not touching each other; the last chamber occupies sometimes two thirds of the last whorl; the partitions are like those of the Ammonites, regular, in six lobes, but without subsidiary lobes; the siphuncle dorsal and connected. — 9 species, fossil.



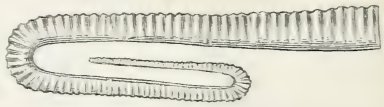
Crioceras cristatum.

Ancyloceras. *D'Orb.* — *Shell* many-chambered, rolled spirally on the same plane, finally prolonged into a kind of curved staff; the whorls of the spire do not touch; the straight part of the shell is without partitions; these latter

Ancyloceras spinigerum.

are in general like the Ammonites, with six unequal lobes, which consist of very long unequal parts; the siphuncle dorsal and connected. — 38 species, fossil.

HAMITES. *Parkinson.* — *Shell* many-chambered, rolled on the same plane, but irregularly spiral; the spire being extremely elliptic, strongly bent at both ends, and between these parts straight or but slightly curved; the partition walls symmetrical, consisting of six very unequal lobes, of which the upper side-lobe is split into two equal parts; dorsal lobe very short. — 58 species, fossil.



Hamites attenuatus.

Sowerby represents some very large species in "Mineral Conchology," particularly *H. grandis*, which is as thick as a child's arm, and another which is remarkable from being beset with spines at the outer edge three eighths of an inch long; it is of large size, found in chalk-marl in Oxfordshire, and named *H. armatus*.

PTYCHOCERAS. *D'Orb.* — *Shell* many-chambered; round or compressed; not spiral; bent back upon itself so that

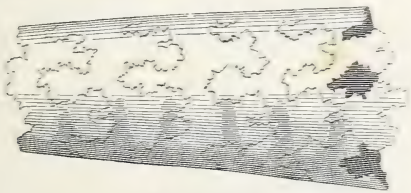
Ptychoceras Emericianum.

the last part is in contact with the preceding the whole length; the partitions symmetrical, with six slightly unequal lobes, of which the upper side-lobe is divided equally; the dorsal lobe the longest; the siphuncle dorsal and connected. — 7 species, fossil.

TOXOCERAS. *D'Orb.*—*Shell* many-chambered, in form a curved bow, at no time describing a spiral; the last chamber occupies a large space; the mouth is very slightly oblique, the partitions symmetrical, with six lobes; the siphuncle dorsal and connected.—19 species, fossil.

Toxoceras annulare.

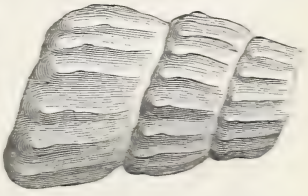
BACULITES. *Lam.*— *Shell* straight, cylindrical, sometimes slightly compressed, and somewhat conical, partitions sinuous, transverse, a little distant; the upper part destitute of divisions, and probably held the body of the animal. Siphuncle at the margin.—11 species, fossil.



Baculites anceps.

These fossils are abundant in the limestone of Valognes in Normandy. Mantell calls them straight Ammonites.

TURRILITES. *Mont.*—*Shell* spiral, turreted, with contiguous whorls, all apparent; partitions sinuous, with six lobes, the dorsal the longest; mouth roundish: the siphuncle either at the edge or near the base of the whorls, and connected.—27 species, fossil.



Turrilites costatus.

These curious fossils are found in Kent and in France:

they vary in size, from a few inches to two feet in length; they are found reversed or sinistral, as well as with the spire in the usual direction.

HELICOCERAS. *D'Orb.*—*Shell* many-chambered, spiral, rolled up either to the right or left, but the whorls do not touch, being completely separated from each other: the mouth oval and entire; the partitions formed like those of *Turrilites*, the siphuncle lying above.—11 species, fossil.

Helicoceras rotundum.

CLASS II.—GASTEROPODA. (Cuvier.)

THE class Gasteropoda forms the most numerous division of the Mollusca. The animals move regularly by means of a fleshy disk or foot, using it either for creeping or swimming. On the back is a mantle, more or less dilated, which in most species produces a shell, though in some it is merely rudimental, and in a few instances entirely absent. The head is always clearly distinguishable, and bears from two to six feelers; these are rarely wanting. The eyes are generally small (largest and most perfect in the Strombus), and are situated sometimes directly on the head, sometimes on separate stalks, or at the bottom, middle, or extremity of the feelers. The lungs display considerable diversity: some Gasteropoda breathe the air at once into apertures, the walls of which are lined with a vascular network (as land snails); others inhale air mixed with water through gills (as most sea molluscs); others, again, seem to possess no particular organ of respiration.

The organs of digestion also manifest much diversity; the mouth is formed by contractile lips, which by many can be protruded in the manner of a proboscis; the tongue is a long band (with a few exceptions) beset with numerous little horny hooks disposed in rows, and directed backwards; these reduce the food to a state to be swallowed, and it is then received into the stomach, which frequently possesses rows of calcareous teeth which help the further comminution.

In most Mollusca the mantle forms a shell, which consists of animal matter, in which is incorporated more or less carbonate of lime. In that genus of land snails which Ferussac has called Arion, there are only *unconnected* morsels of chalk to be found; in most cases, however, the shell obtains considerable consistence, strength, and often great weight. It is seldom covered so entirely by the mantle as to be called internal, but is usually exterior and of sufficient size to admit of the animal withdrawing within it completely. A second piece of horny or calcareous shell adheres in many Gasteropoda to the foot, and when the Mollusc retires into its house, it closes the entrance more or less completely, whence it is called the operculum. Of all the Gasteropoda the shell is formed of one single piece, except the genus Chiton, which forms its shell of eight portions overlapping each other, forming a very curious exception.

All the Gasteropoda are propagated by eggs, either hatched in the body of the parent, or attached by it to plants, &c. The young in some cases, on leaving the egg, perfectly resemble the parent, in other cases, they undergo a remarkable metamorphosis.

Proportionally few live on land, and then chiefly in moist places; yet fewer live in fresh water; the greater portion of Gasteropoda being inhabitants of the ocean.

Most of them can only creep, and even when they swim, it is only a sort of creeping on the surface of the water, on which they suspend themselves by the sole of the foot, body downwards; a few only can swim, or float, as *Janthina;* some never change their habitats, but remain fixed to one spot, as the *Patella*, the foot of which, in time, eats a hollow in the rock on which it is fixed; others are attached by their own shells, as *Magilus* and *Vermetus*. The *Stylina* lives parasitically in sea eggs and star-fish.

A satisfactory classification is not yet possible, as many important points are still involved in obscurity: Philippi follows Cuvier generally in dividing the Gasteropoda into the following eight orders: —

1. PECTINIBRANCHIATA. — Organs of respiration in the shape of a comb, and for the most part single; the animal forming a shell.

2. SCUTIBRANCHIATA. — Organs of respiration comb-like, but generally double. *Shell* snail-shaped or cup-shaped.

3. CYCLOBRANCHIATA. — Organs of respiration placed in a circle round the body, in the form of little leaves. — *Shell* spiral or cup-shaped.

4. CIRRIBRANCHIATA. — Organs of breathing hairlike, situated in two lobes above the neck; the foot like a proboscis. *Shell* tubular, slightly curved, and open at both ends.

5. TECTIBRANCHIATA. — Organs of breathing unsymmetrical; more or less covered by the mantle. *Shell* sometimes completely enclosing the animal; at others rudimentary and internal.

6. PULMONATA. — The animals breathe air through a lung cavity, or have proper gills. They live on land or in

fresh water, and have mostly a spiral shell. [This order embraces more than Cuvier's Pulmonata.]

7. NUDIBRANCHIATA. — The animals breathe through lungs of various forms, which are naked, and situated on the back, and never form a shell. They live, without exception, in the sea. (Cuvier's Inferobranchiata.)

8. HETEROPODA. — The foot of the animal is changed into a vertical fin, which serves for swimming; they live only in the sea. *Shell*, when present, generally thin.

ORDER I.

PECTINIBRANCHIATA.

ORGANS of respiration in the shape of a comb, and for the most part single; the animal always forming a shell.

This order of the class Gasteropoda contains the greatest number of genera; but as long as the animals of all the genera and species are not perfectly known, the classification must remain in some degree uncertain. The shells of many of them are amongst the handsomest and most striking known. The genera Conus, Cypræa, Murex, Strombus, Mitra, and Oliva, are favourites with all collectors of shells — and deservedly so — the varied forms, characters, colouring, and markings rendering them objects of great beauty and interest.

SECTION I.

The animals have a distinct breathing tube, and the shell is channelled, with the exception of that of the genus Coriocella, in which it is internal.

Family 1.— *STROMBACEA.*

The animals of this family have the eyes large, placed on stalks; the tentacula springing from the middle of the stalks, or not present; the foot is not adapted for crawling, but is used for springing. The shell has the aperture sinuated below, near the canal, which is often lengthened, and turned to the left; the outer lip is winged, or in the form of claws in the mature shell. All the genera are marine.

PTEROCERAS. *Lam.* — *Shell* oblong; spire small; mouth terminated by a rather long canal; left lip ridged, right lip dilated in the adult into several claws, and having a sinus near the canal; operculum horny. *Animal* described in the family.—10 species.*

Pteroceras rugosa.

The number of claws varies in different species; the *Pteroceras millipeda* has a great many, but they are small; in others they are straight, or nearly so, and smooth; whilst many of them have these appendages very much curved.

There is much singularity in the growth of these shells, and the appearance they present at various periods is strikingly different. In the young state of the animal the shell has no claws, and these gradually make their appearance, at first in the form of short and open canals, which by degrees assume the length and curve of the adult and completed shell, and eventually are closed up with shelly matter and become solidified.

Nearly all the species are inhabitants of the Indian Ocean, and many of them exhibit the most beautiful

* Reeve's Iconica.

colours on their internal surface. They are often known by the common names of spider or scorpion shells.

STROMBUS. *Lin.* — *Shell* thick and oval; spire moderate; mouth long, and rather narrow, terminated by a canal more or less long and recurved; right lip dilated in the adult, and having a small notch or sinus near the canal; left lip sometimes thickened; operculum horny, long and narrow. *Animal,* the tongue has an upper broad convex tooth in the middle, with seven notches, the side teeth are divided into three points, the two outer of which are simple hooks; eyes very large; the other parts of the animal are exactly described in that of the family. — 56 species*; also fossil.

Strombus lobatus.

These shells are brought from India, Africa, and other tropical countries, where they are found on reefs at low water. Many of them attain a large size; and the *Strombus gigas,* called the fountain shell in the West Indies, is used for the purpose of paving the streets at Santa Cruz and elsewhere; great numbers are also brought to Europe for the manufacture of cameos. The spire in many species is hidden by the expansion of the outer lip; the latter is sometimes reflected inwards, towards the middle part.

The animals of the *Strombus* occasionally produce pearls. Mr. Wood, in his "Zoography," relates that he saw a pink pearl which was taken from the body of the animal of the *Strombus gigas,* which is caught for the table off the island of Barbadoes. The pearl was discovered by chance, whilst the men were employed in cleaning the mollusc. Its weight was 24 grains; but it would

* Reeve's Iconica.

have been more valuable if it had been round. The same author states that only four of these pearls had been discovered in the vast numbers of molluscs that are annually brought to market in that part of the world, though he has reason to believe that this is in some measure owing to the carelessness of the negroes. This pearl was exactly of the same colour as the interior coat of the shell.*

ROSTELLARIA. *Lam.*—(Fusus *Humph.*) *Shell* rather long, the spire and canal being both elongated; right lip dilating in age, and slightly digitated, one digitation being carried more or less towards the apex of the spire, and attached to the whorls; sinus near the base; operculum horny, and very small. *Animal*, precisely described in the account of the family.—10 species†; also fossil.

Rostellaria columbata.

These shells are more fusiform or turreted than the other genera of this family, and are of a very elegant form which makes them much sought after by collectors; they are found in the seas of China and the Moluccas. *R. rectirostris* is a very rare shell. *R. macroptera* is a curious fossil species, having the outer lip very large, nearly circular, and extending quite to the lip of the spire.

Philippi here adds *Hippocrene* and *Rimella* as subgenera, containing only fossil species.

DIBAPHUS. *Phil.*—*Shell*, rolled inwards nearly cylindrically round a pointed spire; the mouth narrow, linear, toothless, notched below; the columella lip curved back, the outer lip thickened, straight, with a slight indication of a sinus. *Animal* unknown.—1 species.

* Penny Cyclopædia, article *Strombidæ*. † Reeve's Iconica.

The only known species, Swainson includes with the Mitra, and Reeve with Conus.

TEREBELLUM. *Lam.* — (Seraphis *Gray.*) *Shell* oblong, smooth and convolute; spire pointed and short; aperture narrow and long; right lip rather sharp and truncated, left lip quite smooth. *Animal,* having the head prolonged into a proboscis; the eyes on very long stalks, tentacula entirely absent; the foot appears to have an operculum. — 1 species, also fossil.

Terebellum subulatum.

T. subulatum, the only species, is brought from the Indian seas; it is thin, delicate, and prettily marked with bands and cloudy spots: the fossil species are curious, having the spire concealed by the last whorl.

ROSTROTREMA. *Lycett.* — *Shell* differing from *Rostellaria,* by having the upper canal not carried over the spire; and the outer lip but little dilated, extending above, only as far as the last whorl but one. This canal has not a thickened edge. It differs from *Strombus,* in having no winged sinus. — About 11 species, fossil.

PTERODONTA. *D'Orb.* — *Shell* oval, somewhat long and swollen, lengthening regularly with simple smooth whorls, the last having an entire dilated lip, which sometimes is thickened outwardly, but has neither notch nor sinus; sometimes prolonged at the base; the aperture slightly narrowed, oval, and with a short, oblique canal in the upper part; inside the outer lip a tooth, or rather a prolonged fold. — 6 species, fossil.

SPINIGERA. *D'Orb.* — *Shell* like *Rostellaria,* but the whorls are keeled, and the outer lip has a spine on the keel, which being formed at every half whorl, gives it

somewhat the character of the genus *Ranella.* — 3 species, fossil.

Philippi says that D'Orbigny formed this genus by the union of three fossil shells — *Ranella longispina*, *Murex rostellariformis*, and *Chenopus spinosus.*

Family 2. — *APORRHAIDEA.*

The animals have the head prolonged into a long snout, near the bottom of which are two long cylindrical tentacula, with the eyes placed at the base; the tongue has in the middle a row of teeth, and on each side three rows of hooks. The shell is spindle-shaped; the aperture ends below in a point, or is lengthened into a canal; the outer lip is thickened, or wing-shaped, in the adult. All the genera are marine.

Aporrhais. *Da Costa.* (Chenopus *Phil.*) — *Shell,* spire rather long; whorls tuberculated; mouth narrow, with a short canal; right lip expanded, lobed, or fingered, in the adult; operculum small, pointed. *Animal,* with a long muzzle; tentacles cylindrical, bearing eyes or prominences near their external bases; mantle digitated, loose, with a rudimentary siphon; foot rather short, angular in front, obtuse behind, not centrally grooved; operculigerous lobe simple; branchial plume single, long; tongue linear, with a single median denticle, and three uncini on each side, the second and third elongated and simple.* — 3 species, also fossil.

Aporrhais pes-pelicani.

A. pes-pelicani, a British species, is found plentifully on some of our coasts: the other species, *A. occidentalis* and

* Forbes' British Moll.

pes-Carbonis, inhabit the coasts of the Atlantic and Mediterranean. The latter is now claimed as British, as it has been recently taken off the coast of Zetland.

STRUTHIOLARIA. *Lam.* — *Shell* oval; spire elevated; mouth oval, truncated at the lower part; right lip thickened, left also thickened, and spread-out; operculum claw-shaped and horny. *Animal*, foot large, thick, with a small operculum attached; head large, with a long cylindrical trunk; two long pointed tentacles, with eyes on the lower part. — 4 species*; also fossil.

Struthiolaria papulosa.

These shells are not common; they are shaped somewhat like the Buccinum, but differ in having a thickened lip in the adult. They come from New Holland and New Zealand. The usual length of the shell is about two inches, though a few specimens have been found larger. The fossil specimens are also found in the above-mentioned countries.

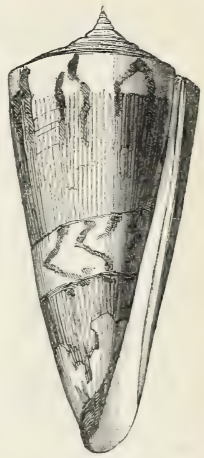
Family 3. — *CONEA.*

The animals have a small snout-like head; small cylindrical tentacula, with the small eyes near the tips; the tongue has on each side a row of straight prickles, each provided with a channel; foot long and narrow, with a narrow operculum. The shell is inversely cone shaped: the aperture notched at the lower part, and also near the suture. Marine.

CONUS. *Lin.* — *Shell*, shaped like a cone, the spire either flat, obtuse, retuse, or sharply pointed; aperture

* Reeve's Iconica.

narrow and long; left lip smooth; right not thickened; operculum very small and horny; usually an epidermis. *Animal,* head very distinct; two short and stout tentacula, far apart, and with eyes near the tips; foot oblong, truncated in the front. 337 species*: also fossil.



Conus generalis.

Many of the species of this favourite genus are marked with the most beautiful and elaborate figures, some of them resembling Hebrew, Greek, or Arabic characters; in others the colours are arranged in almost endless patterns, clouded, veined, marbled, dotted, striped, and banded in every kind of form. Mr. Reeve observes that "they present a most vivid display of colours, and the mechanism of their calcifying filaments must be of very exquisite workmanship. In order to produce the wondrous detail of pattern portrayed in the *Conus gloria-maris,* which is scarcely discernible without the aid of a lens, the mollusk must be endowed with an astonishing ingenuity of design; and for the simultaneous production of so many colours as are exhibited in the *C. aurisiacus* or *imperialis,* its molecular fluid must have many more sources of colouring matter than a weaver at his loom. Where indeed do we find a brocade of gold as in the *C. textile,* or a web of such elaborate meshes as in the *C. abbas* or *Victoriæ.*"†

Many of the species are very rare; a specimen of the *Conus gloria-maris* has been sold for as much as one hundred guineas. The *C. cedo-nulli,* an exquisitely beau-

* Reeve's Iconica. † Elements of Conchology.

tiful species, is seldom obtained for less than five or ten pounds.

When a section is made of a cone it will appear that the sides of the internal whorls are much thinner than those of the external; it is supposed that this arises from the animal reducing the thickness of these internal walls by absorption, either for the purpose of giving itself more room, or in order to diminish the weight of the shell. They are found abundantly from shallow to deep water in all tropical countries, particularly Asia; but become more rare as they approach the northern hemisphere; a few species only inhabit the Mediterranean. They are generally found in holes of rocks and coral reefs.

Family 4. — *PLEUROTOMACEA.*

The animals have no snout, but a proboscis; and the tentacula are united together at an acute angle, with the eyes about half way up; the tongue on each side has a row of prickles similar to those of the family Conea, which are simple, and without hooks. The shell is spindle-shaped, the aperture is lengthened at the lower part into a canal or simply notched, and the right lip has a deep slit near the suture. — Marine.

Pleurotoma babylonica.

PLEUROTOMA. *Lam.* — *Shell* turreted or fusiform; canal straight and rather long; right lip with a slit at the upper part near the suture; left lip smooth; operculum small, sharp-pointed, and horny. *Animal* described in that of the family. — 369 species*; also fossil.

* Reeve's Iconica.

The species of this genus are found in the eastern and tropical seas, many of them being abundant at Java. *P. Babylonica* and *grandis* are two of the most striking; but there are many of very elegant forms.

PERRONA. *Schum.* — *Shell* spindle-shaped, prolonged into a canal at the base; the outer lip has a slit, and between that and the canal a sinus. The *animal* has an operculum. — 2 species.

The *Pleurotoma spirata* and *lineata* of Lamark form this genus.

CLAVATULA. *Lam.* — *Shell* greatly resembling *Pleurotoma*, but having a very short canal; the right lip has a sinus parallel to the suture; the upper part of the whorls are tuberculated or spined. The *animal* forms an operculum.

Clavatula imperialis.

Founded on *Pleurotoma auriculifera*, &c.

DEFRANCIA. *Millet.* — *Shell* turreted, with a short distinct canal; the aperture long, oval; the outer lip divided from the suture by a sinus. *Animal*, having the foot truncated, prolonged on each side into a hook; no operculum.

Defrancia linearis.

Founded on *Pleurotoma harpula.*

DAPHNELLA. *Hinds.* — *Shell* thin, fragile, elongated in form, the outer lip acute, and separated from the last whorl so as to leave a sinus; aperture of a lengthened oval, scarcely any canal, and with the surface usually transversely striated. *Animal*, not known.

This genus appears to be separated from *Defrancia* by the almost complete absence of a canal. The type is *Pleurotoma linnæiformis.* Kien.

MANGELIA. *Risso.* — *Shell* fusiform, longitudinally

ribbed; aperture linear, lip thickened, slightly sinuated at the upper part; canal very short. *Animal*, with slender variously formed tentacula, converging at their inner bases, and bearing the eyes at various heights on external bulgings; siphon produced beyond the canal of the shell; two branchial plumes; proboscis retractile; tongue with a simple rachis, and a single series of subulate denticles arming each lateral membrane; foot ample, truncate in front, variously shaped behind; operculum usually wanting, when present unguiculated with a terminal nucleus.* —71 species.†

Mangelia taeniata.

Mr. Hinds, in the Zoology of the voyage of the "Sulphur," says that the animal of these shells is found in various situations, on reefs, under stones, &c. They are brought from various parts of the world, and several species are natives of our coasts.

Bela. *Gray* (Defrancia *Möller*). — *Shell* spindle-shaped, ribbed longitudinally, keeled beneath the sutures; aperture rather long, somewhat narrowed below, no sinus above.

The type is *Murex turricula.* Philippi remarks that Lovén placed these shells with Tritonium, so little resemblance do they bear to Pleurotoma.

Bela turricula.

Borsonia. *Bellardi.* — *Shell* fusiform, lip simple, the sinus deep, and separated from the suture; the columella lip provided with a fold. — 1 species, fossil.

Conopleura. *Hinds.* — *Shell* coniform or involute, with the spire conically elevated; with a deep posterior

* Forbes' British Moll. † Reeve's Iconica.

sinus, the edge of which is callous; outer lip smooth; columella rather lengthened; aperture linear; scarcely any canal. — 1 species.

C. striatus is described by Mr. Hinds.

Family 5. — *MURICEA.*

The animals of this family have mostly a small foot, without appendages; the head is generally small, at no time prolonged into a snout; the tentacula are, for the most part, small, bearing the eyes about the middle; the proboscis is projecting; the tongue is only armed with three rows of teeth. The shells are of a variety of forms, but have always a notch or canal at the base of the aperture. Most of them have an operculum, which is horny. — Marine.

Fusus. *Brug.* — *Shell* fusiform or spindle-shaped, the canal and spire being both sometimes considerably elongated; left lip smooth, right waved or toothed; operculum horny and curved. *Animal* ample, its head flanked by rather thick subulate tentacles, bearing the eyes on bulgings on their outsides not very far above their thickened bases, which internally are separated from each other by a capital lobe; proboscis long; tongue armed with transverse rows of teeth, each row composed of a quadrate axile loop, flanked on each side by a hamate or scythe-shaped lateral; mantle even-edged, siphon not very much produced beyond the canal; branchial plumes two, unequal; foot large, oval, subtruncated in front, obtuse behind, bearing the operculum on a very short rounded

Fusus nobilis.

lobe. Nidus of one or more capsules.* — 91 species†; also fossil.

The localities of this genus are the Indian, Northern, and Atlantic Oceans, the Red Sea, &c. Many of the species are transversely striped, and are covered by an epidermis. *F. longissimus* is a remarkably long, turreted shell. *F. colosseus* is very large, often found more than eleven inches long; and other species are five or six; many of them are very graceful in form and beautiful in structure; but the colours are not vivid. *F. pagodus* is a beautiful shell, the whorls being coronated. The animal of *F. antiquus* is eaten in Scotland, and called "red whelk," or "buckie."—There are six British species.

Fasciolaria. *Lam.* — *Shell* fusiform, and not very thick; spire of a moderate length; aperture oval; canal rather long, sometimes slightly bent; right lip sharp, and often wrinkled or rayed inside; left lip having two or three oblique plaits. *Animal* very like that of *Fusus*, and the operculum exactly so. — 16 species‡; also fossil.

Fasciolaria distans.

Natives of the Indian seas, the Antilles, and the Isle of France, also found in the Mediterranean. They are not numerous, the colours rather brighter than those of Fusus. *F. distans* is a beautiful shell.

Turbinella. *Lam.* — *Shell* large, heavy, and pear-shaped; spire short; mouth oval, with either a long or short canal; left lip with from three to five plaits, which are at right angles to the axis of the shell; operculum small and horny. *Animal* not to be distinguished out-

* Forbes' British Moll. † Reeve's Iconica. ‡ Ib.

wardly from those of *Fusus*, *Murex*, *Purpura*, and *Columbella* (Philippi). — 73 species.*

Turbinella pyrum.

Many of these shells are exceedingly heavy. *T. pyrum* is called in Ceylon the "shank shell," and is frequently beautifully carved by the natives; a reversed specimen is considered a great rarity, and held sacred by the Cingalese. They are found principally in the Indian and African oceans.

Ficula. *Swain.* (Sycotypus *Gray*). — *Shell* thin, pyriform, the base lengthened into an elongated channel; the upper part ventricose; spire very small, depressed; inner lip wanting. *Animal* having an elongated proboscis with the front portion of the foot rounded and lobed; tentacula long and tapering; eyes very large; no operculum. — 4 species.†

Ficula lævigata.

Mr. Adams, of H.M.S. Samarang, informed Mr. Reeve that the animal of the Ficula was very lively, "crawling," he says, "with considerable velocity, and owing probably to the lightness of its shell, able to ascend the sides of a glass vessel in which I had it captive, with facility. In the species I observed (*F. lævigata*), the mantle was bright pink, spotted with white and lighter pink, the under surface of the disk being of a dark chocolate colour, with yellow scattered spots; the head and neck were pink, and also covered with yellow spots."‡

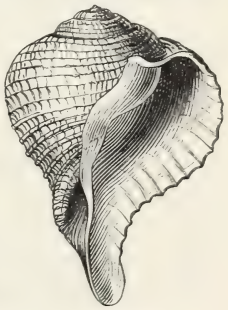
Cochlidium. *Gray.* — *Shell* pear-shaped nearly, stretching out into a long canal, and transversely grooved;

* Reeve's Iconica. † Ib. ‡ Ib.

aperture pear-shaped, converging into the wide canal; the outer lip thin, simple, angular at the upper part, and tuberculated. *Animal*, with a prolonged conical snout-like head, with a proboscis, which can be protruded considerably; tentacula small, and placed on the side of the mouth; eyes small, situated on the outer base of the tentacula; foot oval, blunt before; no operculum.

Philippi remarks, that to this genus only belongs *Pyrula tuba* of Lamark, and probably *P. ternatana*, and one or two other similarly shaped species.

Pyrula. *Lam.* (Cassidulus *Gray*). — *Shell* pear-shaped; spire short; mouth oval; left lip smooth; canal straight, sometimes narrow at the extremity; umbilicated or not. *Animal*, with a narrow head, very much elongated, having two small tentacula at the end, at the base of which externally are the eyes; the foot moderately large; a horny oval operculum, pointed at the lower end.—29 species*; also fossil.



Pyrula bulbosa.

Many species of this genus are brought from the Indian Ocean and Red Sea. The *Pyrula canaliculata* is found in the Northern Ocean; it is a large but light shell, six inches in length. The *Pyrula rapa* has the spire quite flat, and if placed upon that part will stand upright; it is very rare. In the British Museum is a specimen of a *Pyrula Bezoar* that appears to have grown with perfect regularity until the formation of its last half whorl, which is thrown considerably more than half an inch out of its

* Reeve's Iconica.

proper position by a group of barnacles; these had probably attached themselves to the back of the shell of the *Pyrula* at an earlier stage; and as the latter increased in size, at length filled the place that should have been occupied by the inner lip, which, on meeting with this interruption, diverged from its course, and was thrown over the barnacles. Had the shell not been taken until a later period, there can be little doubt that the animal would have at length destroyed the barnacles, or completely hidden them from view, although it would appear that it had not the power to remove them by absorption while they retained their vitality.*

MUREX. *Lin.* — *Shell* oblong, spire rather short; canal generally long, sometimes contracted, and sometimes partially closed; varices three or more on each whorl, spiny, foliated or rough, and connected with those of the whorl above; aperture round and small. *Animal*, with a broad lunate flattened head, flanked by two tentacula having stout bases, bearing the eyes at one half or two thirds of their length; proboscis retractile, moderately long; tongue armed with transverse rows of teeth, each row composed of a central transversely and quadrately oblong axile tooth, with three recurved denticular processes,

Murex tenuispina.

* Gray.

and two claw-shaped lateral teeth; mantle lax, produced into a siphon, which is not extended much beyond the canal of the shell; branchial plumes two; foot oval or sub-quadrate, rather small, posteriorily obtuse.* — 188 species†; also fossil.

These shells are found in nearly every part of the world; the finest species come from tropical countries, and are remarkably curious. The *Murex tenuispina*, or Venus's Comb, as it is called, is entirely beset with long sharp spines, which the animal has the power of dissolving and replacing by a smooth and even surface whenever it finds it necessary to remove them, in enlarging its shell. This faculty is also possessed by other species, but it is very conspicuous in the *tenuispina*. In specimens in which the process is going on, there may be observed a notch formed by this means in the base of the spines, the completion of which eventually causes them to separate from the shell.‡

The animals of *M. trunculus* yield a purple dye, which was much used by the Tyrians. *M. brandaris*, another Mediterranean species, was also used for the same purpose. *M. erinaceus* and *corallinus* are British: the animal inhabitant of the former is yellowish white, that of the latter a brilliant scarlet colour.§

Typhis. *Montf.*—*Shell* greatly resembling the *Murex*, but the spines are tubular, particularly the one at the base forming the canal. *Animal*, externally not to be distinguished from the *Murex*. — About 12 species; also fossil.

Typhis Sowerbyi.

Tritonium. *Cuv.* (Triton *Lam.*) — *Shell* oblong;

* Forbes's British Moll.
† Reeve's Iconica.
‡ Gray.
§ British Moll.

canal short or long; varices placed alternately on each whorl, often considerably distant from each other, and never longitudinally united as in *Murex;* right lip often wrinkled, and the left occasionally thickened; operculum horny; the epidermis often thick, hairy, or tufted with bristles. *Animal,* differing from the *Murex,* being almost always brightly and variously coloured; the foot smaller, but thicker; the head large, projecting between the tentacula; these are long and conical, bearing the eyes externally, exactly in the middle; a tolerably long cylindrical proboscis can be projected from the mouth. — 102 species*; also fossil.

Tritonium variegatus.

The shells of this genus are found in the Mediterranean, Indian, and South Seas. In many of the countries near which they abound, they are used as instruments of music, and called Conch shells. By breaking off the apex, or boring a hole, and blowing through the aperture, notes can be produced; and they are employed in this manner by some nations as military horns. In the early ages of Greece, it was customary for the common crier to introduce himself to the notice of the people by lustily blowing through a shell, and the *T. variegatus* was the one generally selected.† This shell is often met with fifteen inches, or even two feet in length; it is found on the Asiatic shores, and is frequently beautifully coloured. *T. tritonis* is used by the Australian natives for the same purpose.

Ranella. *Lam.* — *Shell* oval, rather flattened; canal short; two rows of varices situated at the distance of half

* Reeve's Iconica. † Reeve.

a whorl from each other, longitudinally united, and forming a ridge on each side of the shell; canal either long or short; a sinus, or short canal at the upper part of the aperture. *Animal* like that of Triton. — 50 species*; also fossil.

Ranella crumena.

From the Indian and American Oceans, and the Mediterranean Sea. Some of the species are very handsome shells, the canal at the upper part of the aperture, and the peculiar situation of the varices, being their great characteristics.

PURPURA. *Brug.* — *Shell* oval, thick, either smooth or tuberculated; spire short; aperture large and notched; left lip depressed and flattened; right lip generally toothed or wrinkled; operculum thin, half-moon-shaped, and horny. *Animal*, with a broad lunate flattened head, flanked by two tentacula, which have broad and stout bases, composed of the shortened eye pedicles, united with the tentacles for nearly half their length; beyond the eyes the tentacles are stoutly subulate; proboscis reticulate, moderately long; tongue long, armed with teeth, which are ranged three in a row, the middle or axile one broadly quadrate and tridentate, the laterals claw-shaped; jaws linear, corneous; mantle lax, produced into a short siphon, which is rarely projected far beyond the canal of the shell; branchial plumes two; foot ovate, oblong, or subquadrate; posteriorily obtuse, anteriorily emarginate.† — 80 species‡; also fossil.

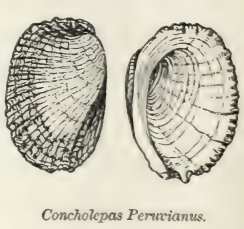
Purpura columellaris.

The *Purpura* is found most abundantly in warm seas,

* Reeve's Iconica. † British Moll. ‡ Iconica.

where the shells attain the largest size, a few only of the species being met with in Europe; they are chiefly litoral, or found on and near the sea coast. It was from the animal of this genus that the Roman purple dye was obtained. *P. patula* is supposed to be the species; it is found in the Atlantic Ocean and Mediterranean Sea. The species *P. lapillus*, found on the British coasts, affords a small quantity of this colouring matter. The animals also of the Scalaria and Janthina secrete this fluid, which becomes a rich purple when it has been exposed to the air. This secretion is not now used, the cochineal insect furnishing us with a dye much more readily obtained. They seem to be very voracious animals, preying on other molluscs.

CONCHOLEPAS. *Lam.*—*Shell* thick and rough; apex inclined towards the left lip; mouth very large, with a slight notch at the base; right lip having two teeth at the base; an operculum. *Animal* like the *Purpura*.—Only 1 species, recent.



Concholepas Peruvianus.

Of this singular genus the only species known is very abundant on the coasts of Peru and Chili, and is known by the name of *Concholepas Peruvianus*. It often grows to a large size, two or three inches in length, and, although not beautiful, is a curious shell. In its shape it has more analogy with the *Patella* family than any other; but from the different form of the animal, and the circumstance of its constructing a large operculum, it is really not connected with that family. The animal is eaten in South America, and is so common, that at the doors of the fishermen's huts there is always a large heap of these shells; and they are burnt for lime. Some years ago

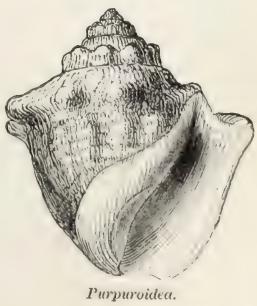
these shells were rare in cabinets; and though they are now oftener seen, they are by no means very common.

LEPTOCONCHUS. *Rüppell.* — *Shell,* sub-globular, delicate, fragile, translucent; spire low, and nearly effaced by the encroachment of the last whorl; aperture large, and in form somewhat like the letter S reversed; the two margins not united; the right delicate at all ages, and a little expanded; no columella or umbilicus. *Animal,* with a lengthened, but entirely retractile proboscis; the mouth appears to be unarmed; two flat, short, triangular tentacula, which are connected at the base, and have the eyes about half way up, on the outside; the foot moderate; the mantle has a circular edge, with a slight prolongation on the left side; the gills are furnished with a single comb. — 1 species.

Leptoconchus.

The shell of this genus is of a dirty milk-white, furrowed externally. It is found in the Red Sea, where it is embedded in calcareous masses of *Polyparia,* having no communication with the water except by a moderate opening.

PURPUROIDEA. *Lyc.* — (Purpurina *D'Orb.*) *Shell* ventricose, with a wide mouth and an acute spire, composed of several, generally convex, coronated, or thorny whorls; the columella smooth, roundly curved, inclined inwards towards the base; the notch at the base broad, shallow, not curved



Purpuroidea.

back; the outer lip somewhat sinuated, and forming, at its junction with the last whorl, an acute angle. — Fossil.

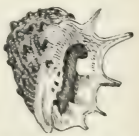
To this genus belong *Natica subnodosa* Roem, *Murex tuburosus* Sw., and a few others from the Oolite. Mr. Lycett, writing upon the fossils of the Oolite formation in Gloucestershire, says, — "These shells are grouped together in the blocks of stone by hundreds, occupying a vertical thickness of five or six feet, and spread over an area of fifty yards wide, and one hundred long. It is to be regretted that this prolific space will ere long be entirely removed; and the *Purpuroidea*, in its perfect state, will probably be only matter of tradition as far as this vicinity is concerned."* (Probably by cutting for a railroad.)

MONOCERAS. *Lam.* — (Acanthina *Fischer:* Rudolphia *Schum.*) — *Shell* oval; mouth rather long and notched; a sharp projecting tooth at the base of the right lip; left lip generally flattened. *Animal*, like the *Purpura.* — 5 species.

Monoceras calcar.

Found in the seas of southern latitudes, particularly those of America, where they frequent rocks.

RICINULA. *Lam.* (Sistrum *Montf.*) — *Shell* oval, generally covered externally with spines; mouth notched and narrow, strongly toothed on each lip, by which the aperture is contracted; spire very short; operculum horny. *Animal*, like that of *Purpura.* — 9 species.



Ricinula arachnoides

These shells are usually small, and when young have no traces of teeth: they are all natives of foreign countries, and are found principally in

* Annals of Nat. Hist. vol. ii. second series.

the Indian seas on coral reefs and rocks. The *Ricinula horrida* is a remarkable species, being whitish, and covered with black pointed knobs; the mouth is full of teeth, and is tinged with a violet colour.

ENGINA. *Gray.*—(Enzina *Gray.*) *Shell* spiral, varicose, aperture oval, linear, with a broad oblique fold on the lower part of the columella; the inner lip spread out and wrinkled, the outer lip thickened within and toothed; grooved above.

Engina turbinella.

Philippi remarks, that this genus approaches some species of *Ricinula* and *Purpura*, but is distinguished from them by the outspread wrinkled inner lip. In young specimens the lips are simple, the aperture smooth, the inner lip concave, with distinct folds near the canal.

COLUMBELLA. *Lam.*—*Shell* oval; spire short; aperture narrow and notched; right lip thickened, turned inwards, and swollen in the middle; shell often transversely striated, and much varied in colour; operculum small and horny. *Animal*, like the *Purpura*, only having a narrow foot.—200 species; also fossil.

Columbella mendicaria.

Small shells, found both in the Atlantic and Pacific, in warm latitudes; the animals prefer shallow water, about rocks and stones. *C. rustica* and others are found on the southern coast of Italy.

COLUMBELLINA. *D'Orb.*—*Shell* oval, thick, ventricose; aperture small, arched, often narrow in the middle, the lower part notched, without a canal, the upper part has a canal carried towards the back, the inside of the outer lip is very much thickened in the middle; and the border of the columella is also very much thickened outwardly.—Fossil.

Distinguished from *Columbella* by the canal at the upper part of the aperture.

POLLIA. *Gray.* — *Shell* shaped like a *Buccinum*, but the lower half narrowed, and the middle more or less ventricose, spire and aperture of equal lengths; inner lip at the base with two or three obtuse and transverse plaits; outer lip crenated internally, and with a siphon at the upper part.

These shells are scarcely to be distinguished from *Buccinum.*

PISANIA. *Bivona.* — *Shell* with numerous indistinct varices, or smooth and spirally striated; notched, or with a short canal; inner lip having in the upper angle a transverse tooth; outer lip crenulated; operculum ovate and acute. *Animal* externally not to be distinguished from *Purpura.* — Many species, also fossil.

Pisania striata.

Found on the shores of Africa, India, and America.

NASSA. *Lam.* — *Shell* globular or oval, according to the spire, which is sometimes short, sometimes rather long; mouth oblong, notched; inner lip thickened, and spread out, occasionally very large; right lip often wrinkled; operculum horny. *Animal*, with a lunate, not very broad head, bearing two long, acute, tentacula, filiform beyond the eyes, which are placed in the hind portions, extending for about a third of their length; proboscis long, retractile, with corneous jaws, and a tongue armed with a triple row of teeth, of which the axile one is broad, sublunate, with numerous serrations, the laterals large and hamate; the mantle lax, produced into a long recurved siphon, which extends for a considerable distance

Nassa mutabilis.

beyond the canal of the shell; foot extensive, expanded, oblong, truncated, and angulated in front, bifurcated at its posterior extremity; branchial plumes two.* — 68 species; also fossil.

They abound in the seas of the South of Europe and the East Indies; and three species are also found on our coasts. They are occasionally seen on the sands and reefs, feeding on the *Mactra* and other bivalves; they pierce the shells with their proboscis, making an extremely regular round hole, and extract the contents through the aperture thus formed. They are very lively and active, and are called "dog-whelk" by fishermen.

Philippi includes Phos *Montf.* as a sub-genus.

DEMOULIA. *Gray.* — *Shell* oval, almost globular, covered with a woolly epidermis; spire short, conical; apex wart-like; whorls compressed; mouth oval; inner lip thickened, and with a furrow at the back; the outer lip curved inwardly, thickened externally, without a varix, strongly plaited inside; canal short, much curved. *Animal* unknown. — 2 species, also fossil.

CYLLENE. *Gray.* — *Shell* small, ovate, swollen, truncated at the base, and slightly recurved; spire short, sharp, pointed; the sutures channelled; inner lip either smooth or finely grooved; a slight notch near the base of the outer lip; interior finely grooved in rays. *Animal* unknown. — 3 (?) species.

Cyllene lyrata.

Sowerby says,—"This genus of small marine shells resembles *Voluta* in general character, but differs in having a smooth columella, without folds."—The species come from the Pacific.

* Forbes' British Mollusca.

Buccinum. *Lin.* — *Shell* rather oval; spire and mouth equal in length; inner lip not flat, but callous or toothed at the upper part; aperture notched; shell slightly covered by an epidermis; operculum horny. *Animal*, bulky; head broad, depressed, bearing two tentacula, somewhat flattened, set wide apart, their tips subulate, their bases thickened for half their length by the connate sustentacula, which bear two rather small eyes; proboscis ample; tongue armed with teeth ranged three in a row, the axile one broad and quadrate, with many crenations, the lateral scythe-shaped, with denticulated bases.* — 118 species†; also fossil.

Buccinum undatum.

These shells are found in all parts of the world; Captain Parry even found two species, *B. glaciale* and *Sabinii*, within the arctic circle: in many places, particularly in northern countries, the animals of the *Buccinum undatum* (under the name of *Whelks*) form an article of food. Besides the *B. undatum* there are three other species found on the British shores. The shells are not remarkable for brilliant colours: but their great diversity of form, delicacy of sculpture, and pencilled markings, render them interesting.

Bullia vittata.

Bullia. *Gray.* (Buccinanops *D'Orb.*; Leiodoma *Sw.*) — *Shell* turreted, spire more or less pointed; sutures sometimes impressed, at others thickened or callous; the inner lip also much thickened towards the upper

* Forbes' British Moll.

† Reeve's Iconica; this number, however, includes the genus Pollia.

part; outer lip simple. *Animal*, foot very large, thin; head flattened; tentacula long, but having no eyes.—26 species.*

The shells of this genus are generally yellowish or pale brown in colour; they are brought from various parts of the world, the animals preferring sandy coasts. Separated from the genera *Buccinum* and *Terebra*.

TEREBRA. *Adanson.* (Subula *Schum.*; Acus *Humph.*) — *Shell* long, turreted, and slender, spire pointed, whorls very numerous, often strongly marked at the upper part, resembling a double suture; mouth oval, and strongly notched; operculum horny. *Animal*, the head snout-shaped, and having two tentacula with eyes at the outer base; foot oval, short, thick, and muscular.—109 species (Sow.); also fossil.

Terebra maculata.

These shells are often called Needle-shells, on account of their sharp, lengthened, and spiral form; some of them exceed ten inches in length, and are often elegantly marked. The notched mouth distinguishes them from the *Turritella*, which they much resemble in shape. Very few of the species are European, the greater number inhabiting the warmer latitudes of the East and West Indies and Africa. They occasionally creep out of the water, still keeping, however, within reach of the spray. *T. maculata*, from Ceylon, is a fine shell. *T. pretiosa* is exquisitely beautiful, many inches in length, and the whorls elegantly marked with curved dark brown lines.

CANCELLARIA. *Lam.* — *Shell* oval or turreted, spire slightly elevated, and pointed; mouth oval, having either

* Reeve's Iconica.

a very short canal or a notch only; right lip sharp, and wrinkled within; left lip with several irregular plaits; no operculum. *Animal*, with the foot almost as long as the shell, very thin, and very flatly compressed, the front truncated portion stretched beyond the head, the latter broad and flat; tentacula long and slender, with the eyes outside at the base. — 70 species; also fossil.

Cancellaria lobata.

These shells are generally found on the sands of the shores washed by the Indian and African seas, and on the coast of America: they are rare, but not remarkable; and are usually rough to the touch, and striped.

ADMETE. *Kröyer.* — *Shell* oval, transparent, brittle, with raised transverse lines; aperture oval, slightly bordered or thickened at the lower part; columella curved, without plaits, obliquely truncated beneath; the lip thin and straight. *Animal*, with the foot large, longer than the shell, broadly truncated before, lancet-shaped behind; head rounded off, small, without proboscis or tongue membrane; tentacula long, and thread-like, with the small eyes upon a tubercle at the outer base; no operculum. — 1 species.

A. crispa is brought from N. America.

Family 6. — *CASSIDACEA.*

The animals have a large, broad foot, a thick head, with a long stout proboscis; the tentacula also long and thick, the eyes on a projection at the base; the tongue has in the middle line one, and on each side three rows of teeth. The shell is of a long, egg-shaped form; the aperture

notched below, or having a short canal bent back; the outer lip with a recurved thickening. — Marine.

CASSIS. *Lam.* — *Shell* large, heavy, sometimes with varices, spire short; aperture either long and narrow, or rather oval, terminated by a short canal abruptly curved towards the back of the shell; outer lip generally toothed, and thickened; the columella often wrinkled, toothed, or grained, and generally widely expanded; operculum horny and crescent-shaped. *Animal,* head large, prolonged into a short snout; two tentacula, with eyes on a thickening at the external base; foot large, but thin and flat; the mantle forms a veil-like appendage over the head, and is also prolonged into a breathing tube very much turned back. — 33 species*; also fossil.

Cassis tuberosa.

These animals sometimes grow to a very large size, requiring of course a corresponding magnitude of shell. They are chiefly brought from the Indian seas, but a few species are found in the Mediterranean; they live on the sand, at some distance from the shore, and occasionally burrow so as entirely to hide themselves. In some species the columellar lip projects above the spire, giving a flat appearance to the lower part of the shell.

The shells of the *Cassis rufa* and other species are exquisitely sculptured by Italian artists in imitation of antique cameos, the different strata of colouring matter resembling those of the onyx and other precious stones. Of these a great variety of ornaments are made, and of late years a considerable trade has been carried on in

* Reeve's Iconica.

them on the Continent. The substance of shells seems to be formed of three plates, the central generally being the thickest, and the outer one the thinnest. The Italian cameo cutters are aware of this circumstance, and cleverly avail themselves of it in cutting the cameos, the ground being always formed of the innermost layer of the three, which is also generally the most transparent.* Mr. Woodwards observes, that the cameos in the British Museum carved on the shell of *C. cornuta* are white on an orange ground; on *C. tuberosa* and *Madagascariensis*, white on a dark claret colour; on *C. rufa*, pale salmon colour on orange; and on *Strombus gigas* yellow on pink.†

MORIO. *Montf.* (Cassidaria *Lam.*)—*Shell* rather oblong; spire not much elevated; mouth long, and rather narrow, terminating in a canal, which is recurved, but does not touch the back; left lip often rough or wrinkled, and detached from the pillar; right lip thickened; exterior of shell transversely grooved, and often spotted with round tubercles; operculum horny. *Animal* nearly like that of the *Cassis.* — 5 species; also fossil.

Morio echinophora.

These shells chiefly come from the seas of warm latitudes; one or two species are found in European countries.

ONISCIA. *Sow.* — *Shell* oblong, rather obtuse; spire short, base rather pointed; mouth longitudinal; canal very short; outer lip thickened, toothed within; inner lip expanded and covered with raised spots; outside ribbed. *Animal* not known. — 6 species; also fossil.

Oniscia oniscus.

* Gray; Philosophical Trans.

† Reeve's Iconica.

The animal is litoral in its habits, and is found in sand in the South Seas: its shell is very beautifully sculptured, and the inner lip curiously covered with raised spots; *O. Dennisoni* has this part of a scarlet hue, with raised white spots.

DOLIUM. *Lam.* — *Shell* large, light, and globular; aperture wide, and notched at the lower part; generally transversely banded or ribbed, the right lip in consequence waved; no operculum. *Animal*, head large, having a large thick proboscis, which can be lengthened, and two tentacula with eyes in the middle; foot large, very thick, muscular, and capable, it is affirmed, of being dilated with water to an enormous extent. — 15 species*; also fossil.

Dolium galea.

These shells are found, for the most part, in the seas of the Indies, Africa, and South America: one species, however, the *Dolium galea*, is met with in the Mediterranean. They are often found on reefs, and sometimes attain a very large size, specimens having been seen as large as a man's head; even then, however, they retain the fragility and thinness of texture which characterise most of the species. The animals are often quite bright with colours of various shades, striped with blue, and having even hues of a copper green; they are said to be inactive, and very voracious. Philippi includes as sub-genera *Perdix* Montf. and *Malea* Valenciennes.

EBURNA. *Lam.* — *Shell* oval, smooth; spire pointed, with the sutures more or less deeply channelled; aperture oblong, and deeply notched; left lip much thickened,

* Reeve's Iconica.

right thin; umbilicus large; an epidermis and a horny operculum. *Animal,* head large, furnished with a thick, cylindrical proboscis; two distant tentacula having eyes at the base; foot short, stout, and thick.—9 species*; also fossil.

Eburna spirata.

The shells of this genus are found in the Indian and Chinese seas. They are all easily distinguished by the orange-brown spots on a whitish ground with which they are marked; and the animal is said to be spotted in the same way.

Family 7.—*VOLUTACEA.*

These animals have a large foot, generally a flat broad head, feelers wide apart; the proboscis retractile; the tongue linear, toothed in the middle, naked at the sides; the breathing tube has an appendage at the base. The shell is either of a globular form, or a narrow spindle shape; the aperture is variously formed, but the inner lip has always plaits.—Marine.

VOLUTA. *Lin.*—*Shell* having a great variety of forms; sometimes bladder-like, or globular, with a short spire and an enormously wide mouth, at others small, spindle-shaped, with a tolerably long spire and a narrow mouth, in the last case always thickened; no canal; the columella always marked with plaits, of which the lower are the largest; the outer lip always simple; the apex sometimes pointed, sometimes mammillated; no operculum.† *Animal* having the foot sometimes twice as long and broad as the shell, at others

Voluta Vespertilio.

* Reeve's Iconica.

† Except *V. musica*, from which Mr. Cuming has taken one from the living animal.—*Reeve.*

scarcely so long, and but a little broader; the head in all species very flat, and generally very broad; the tentacula distant, eyes external at the base, generally on a thickening, but they vary very much; the breathing tube long, turned back, and bearing on each side of its base an upright appendage; the mantle but slightly developed in most of the species; in *V. angulata* it is excessively large, and turns back on the shell.—61 species* (not including Melo and Cymba); also fossil.

This genus, as constituted by Lamarck, contains some of the most beautiful shells that are known: they are generally smooth, shining, and the colours bright and varied; they differ exceedingly in form and size, some being globular, others oval, some turreted, and others with only a very small spire. Some of them have spines at the upper part of each whorl, forming a kind of thorny crown; many are curiously marked with lines and spots, so as to form some resemblance to a line of printed music; and one very scarce species is marked with five or six transverse milk-white bands upon a dark ground, and spotted with reddish brown, making a beautiful contrast of colours.

The *Volutes* are found principally in hot climates, none having been discovered in European seas, and but few in America. They often attain a very large size. The most rare species is *V. Junonia*, very few examples of it are known, not perhaps more than four; it is of a yellowish white, and covered with a multitude of red-brown spots; some round, others almost square, and disposed in transverse rows near one another. All the *Volutes* are marine; but *V. pacifica* ascends the rivers. Some of the fossil *Volutes* are very interesting: the *V. spinosa* has a

* Reeve's Iconica.

row of small spines on the upper edge of the whorls; of which the author has a specimen in her cabinet, so beautifully preserved, that the lines of colour are perfectly distinct.

Melo olla.

The aperture of those shells which form the genus *Melo* of Broderip, as here represented, is much larger than that of many of the other species, and the outer lip and the whole shell are thinner. They are found in the Asiatic seas, &c. Sowerby illustrates 10 species.

Those which constitute the genus *Cymba* of Broderip are found in Africa, and one or two in Australia; they are distinguished by the rude, ill-shaped spire, and the curious ledge which separates the outer lip from the body whorl, as seen in the cut. The animals burrow in the sand at low water. Sowerby describes 9 species.

Cymba.

MITRA. *Lam.*—*Shell* turreted, rather fusiform; spire pointed, long or short; inner lip plaited, the lowest the smallest, outer lip sometimes toothed or thickened: no operculum. *Animal*, foot small, truncated in front; head very small, nearly the whole formed into two blunt, short, but connected tentacula, the eyes placed about the middle; the proboscis sometimes longer than the shell, club-shaped at the end; the breathing tube generally tolerably long.—334 species*; also fossil.

Mitra semifasciata and impressa.

These shells are much smaller and more slender than

* Reeve's Iconica.

the *Volutes*, but are not inferior to them in beauty of sculpturing and colour. They exhibit an infinite variety of patterns and designs; sometimes grooved, sometimes smooth, and variegated with every kind of hue. The form of the shell is of the most elegant proportions; nothing can exceed the beauty of the *M. regina, vittata, militaris, modesta, corallina*, and many others, as shown in Mr. Reeve's admirable monograph of that genus. They abound in the seas of hot climates, the greater number inhabiting the Pacific Ocean, where they are met with chiefly in shallow water, near coral reefs; others, however, are found at great depths. The animal has been supposed to be of a poisonous nature, and to wound, with its pointed trunk, those who touch it.

Family 8.—*OLIVACEA.*

The animals of this family have a very large broad foot, the fore part on each side is divided by a deep incision into a short fore part and a longer hinder part, and the latter is folded over the shell, thus keeping it polished; the breathing tube is long; the head indistinct; the tongue is, according to MM. Quoy and Gaimard, unarmed. The shell is variously shaped, without epidermis, and very smooth; the lower part of the aperture is largely notched; the inner lip thickened, and often striped.—Marine.

Oliva fusiformis.

Oliva.—*Shell* oblong, smooth, and convolute; spire short; sutures channelled or grooved; mouth narrow and long; right lip rather sharp; left lip thickened at the top, and striated; operculum horny and small in some species, in others not existing.*

* Gray.

Animal, head indistinct; two tentacula enlarged at the base, and having the eyes situated near the tips; foot very large, and covering great portion of the shell, the front part projecting far beyond the head, two-lobed, and eared; a thread-like portion of the mantle occupies the narrow canal at the suture; the mantle itself is small.—99 species*; also fossil.

These shells are very common, nevertheless they are very beautiful, and their polished exterior is kept bright by the enveloping foot; many attain a large size. They are brought principally from Asia, but are also found in the African and American seas. The animals are said to be very active, gliding about on the shore, and burying themselves in the sand.

Philippi places the following as sub-genera: *Olivella* and *Scaphula* Sw.; *Strephona* and *Agaronia* Gray.

ANCILLARIA. *Lam.*—*Shell* oblong and very smooth; spire pointed; sutures not channelled, but nearly effaced; mouth wide and long; right lip sharp; left lip having the base thickened, with a shelly ridge. *Animal* almost unknown; the foot, however, is very large —4 species; also fossil.

Ancillaria.

This genus is chiefly confined to tropical climates; the shells are smooth, and highly polished, presenting a surface infinitely more so than can be produced by artificial means: some of them have a small tooth at the lower part of the right lip. When the animal is alive the shell is covered so much by the foot that only the middle of the back can be seen. The *Ancillaria cinnamomea* is exceedingly scarce. The fossil species are very smooth and beautiful.

* Reeve's Iconica

HARPA. *Lam.*—*Shell* oval, smooth, and marked with parallel longitudinal ribs, the upper end of each, near the sutures, is projecting and pointed; spire short; last whorl large and deeply notched; outer lip thickened: it is supposed to have no operculum. *Animal*, foot very large, much wider than the shell, and twice as long, pointed behind, the front part on each side divided by a notch, crescent-shaped, and rising above the head; the mantle on the left side prolonged, and in front formed into a long breathing tube; the head between the long tentacula, the eyes somewhat above the base of the latter; the proboscis small; tongue unarmed.—9 species*; also fossil.

Harpa ventricosa.

The principal localities of this genus are the Red Sea and the Indian and South American Oceans. The *Harpa imperialis*, from the Mauritius, is a remarkably beautiful shell, and exceedingly rare: at one time it could only be procured at an extravagant price, but now it is more common. It is distinguished by the very great number of ribs, which, indeed, are almost close together; and the colours and markings are very elegant and beautiful. There is a fishery for them at the Mauritius and the neighbouring islands, and they are taken at night and at sunrise, when they are probably feeding. Some naturalists† affirm that the animal can, when attacked by an enemy, disembarrass itself of part of its foot, and retire entirely within its shell. The ribs in this genus are evidently the remains of what has been the mouth of the shell at different periods. The *H. ventricosa* is the most common species of this genus, and perhaps the most beautiful.

* Reeve's Iconica.

† MM. Quoy and Gaimard, and M. Reynaud.

The animals display very beautiful colours, scarcely less so than the shell; they are green and pink, and dotted with variously shaped spots.

Family 9. — *CYPRÆACEA.*

The animals have a tolerably large and thick head; the tentacula long, slender, and placed near each other; the eyes placed on prominences on the outer part near the base; the tongue has seven rows of teeth; the mantle has large lobes, which expand on each side, and cover the shell, meeting about the middle. The shell has no epidermis, and is always glossy, from its being covered by the mantle; it is convoluted; when mature the spire is nearly concealed, the lips are thickened, toothed, and plaited, and the outer one rolled in; no operculum. — Marine.

Cyprææ errones.

Cypræa. *Lam.* — *Shell* oval, convex; mouth linear, notched at both ends, thickened and toothed on each side in the adult shell; spire sometimes entirely hidden. *Animal*, with a very large, smooth, or tuberculated mantle; lobes capable of entirely, or almost entirely investing the shell, on which a line or groove marks the approximation of their edges; head broad, sublunate; proboscis retractile; tentacula long, subulate, the eyes on bulgings at their external bases; rows of ligual teeth, composed of one quadrate uncinated axile tooth, flanked on each side by three uncinated hamate laterals; jaws corneous, ligual ribbon rather long; branchial plume single.* — 154 species†; also fossil.

* Forbes's British Moll.

† Reeve's Iconica.

These shells are remarkable for the different appearance they present during the several stages of their growth. Whilst young they are very thin, almost colourless, and dull on the outside; the mouth is rather wide, the outer lip not rolled inwards, but having a sharp edge. At a more advanced period the lips are curved inwards; but the shell is still thin, and the colours not bright. The gradations of advancing growth may be easily remarked in the common *C. Mauritiana*. At a later stage, when it has attained its full growth, the outer lip is rolled inwards and thickened, the back marked with the most beautiful patterns, and bearing an exquisite polish, and the spire, at the same time, if not entirely hidden, scarcely projects. The animal itself undergoes a considerable change in appearance during its growth. Its mantle is at first small, but increases with the enlargement of the shell, and expands at its sides into two large wings, which are generally covered with "warts, spinous processes, forked, tufted, or ramified filaments, or tubular papillæ." From these is deposited the final polished layer of shelly matter, which forms the exterior coating, and which is caused by the animal enveloping the shell entirely in its mantle. At the point where the two expansions of the latter meet on the back of the shell a line is consequently formed, which is called the dorsal line; but occasionally these lobes are so much extended as not only to meet, but to wrap over each other, in which case there is no line. Forbes says,—"The difference of aspect between the mollusks when crawling, with their beautifully coloured soft parts exposed, often completely concealing their enamelled shells, and their appearance when, after being seized, they suddenly and instantaneously withdraw their bodies and

Young.

mantle lobes, and expose the shell, is very curious and surprising."* When at rest the *Cypræa* remains buried under the sand, at a short distance from the shore; it however occasionally traverses the rocks and coast, and may be found under stones and corals.

These shells are generally found in the seas of hot climates, the Indian Ocean, and those of Africa and America. A few species are met with in temperate regions, but they possess no great beauty, neither attaining the vivid tints nor the delicate markings of those more favoured in situation. The *Cypræa Europea*, or Nun Cowrie, is found in abundance on our own coasts.

The *Cypræa moneta*, or Money Cowrie, is the current coin of Siam, Bengal, and Africa: it is collected by the negro women, and sent into different countries. In Bengal 3200 are reckoned to be equivalent to a rupee, or about two shillings of English money. Five bearers are required to carry ten pounds' worth of cowries. It was stated by Mr. Archer, in the Great Exhibition, that in the year 1848 sixty tons of money cowries were imported into Liverpool; and in 1849 nearly three hundred tons were brought to the same place: they are brought there from the Eastern seas, and again exported for barter with the natives of Africa. Specimens of *C. annulus* were found by Mr. Layard in the ruins of Nimroud†, where perhaps they had been used for the same purpose. In the Friendly Islands permission to wear the *Cypræa aurantia*, or Orange Cowrie, as an ornament, is only granted to persons of the highest rank. The *C. aurora* is considered the most rare of this genus. The New Zealanders suspend it to their dress as an ornament, and it is therefore frequently found with an artifi-

* British Moll. † Woodward.

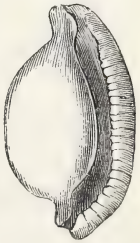
cial perforation. *C. cervina* is supposed to be the largest species, being more than four inches in length. It inhabits the American seas. Philippi states that these molluscs are very timid, and that they live on sea weeds.

ERATO. *Risso.*— *Shell,* small, ovate, with a scar or groove down the back, otherwise smooth; notched at the base; spire rather prominent; last whorl large; mouth narrow; both lips more or less finely toothed, the outer generally swollen in the middle. *Animal,* very like that of *Cypræa,* but the lobes of the mantle are thin.—8 species, also fossil.

Erato mauugeria.

Small shells, principally found in the Mediterranean Sea, the shores of the West Indies, China, and Britain.

OVULA. *Brug.*— *Shell* egg-shaped, sometimes spindle-shaped; inner lip without teeth; outer slightly wrinkled, the extremities generally projecting; spire quite hidden; no epidermis. *Animal,* very similar to that of *Cypræa,* but the ligual ribbon short.—48 species*; also fossil.



Ovula oviformis.

In some species the ends of the mouth are so much lengthened as to make the shell fusiform; this is the case with *O. volva,* the weaver's shuttle. *O. patula,* the English species, is very thin. *O. oviformis,* represented above, is perfectly white outside, and of an orange-brown within; the young shell is as thin as paper. This genus chiefly inhabits the Indian and Chinese seas; it is also found in the Black Sea and the Mediterranean.

MARGINELLA. *Lam.* (Porcellana *Adanson.*)—*Shell* oval, smooth; spire short, more or less depressed; mouth nar-

* Sowerby's Thesaurus.

row, right lip having a thick margin; plaits on the columella lip nearly equal in size; no operculum. *Animal*, with large, usually papillose mantle lobes, reflected over the shell and over the spire; head somewhat muzzle-shaped; mouth with a retractile proboscis; tongue constructed like that of *Cypræa;* tentacles subulate, bearing eyes on bulgings at their external bases; siphon produced; foot large, truncated in front, obtuse behind.*—108 species†; also fossil.

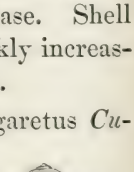
Marginella.

These shells are often very beautifully polished and coloured; many have the spire exceedingly short. The inhabitant covers the shell with its mantle, depositing successive layers of shelly matter, for it is found that the specimens of this genus differ materially in thickness of substance. The species are found in the tropics.

Family 10.—*CORIOCELLACEA.*

The animals have a half globular mantle, which encloses the body and the thin inner shell: the head has two long remote tentacula, with the eyes at the outer base. Shell thin, transparent, ear-shaped, with a few quickly increasing whorls; the aperture very large and entire.

Marsenia. *Leach.* (Coriocella *Blain;* Sigaretus *Cuvier*, not *Lam.;* Cryptothyra *Menke;* Chelinotus *Sw.;* Lamellaria *Gray;* Oxynoë *Couth.*) — *Shell* thin, milky white, somewhat ear-shaped; spire depressed, very small; body whorl very large; aperture large and entire; operculum none. *Animal*, with the mantle entirely investing the shell, emarginate in front; head rather broad,



Marsenia.

* Forbes's British Moll. † Sowerby's Thesaurus.

with two subulate tentacles, separated at their bases, and bearing the sessile eyes at their origin externally; proboscis long; tongue linear, armed with teeth, axile dentate with an apical serrated hook, laterals one on each side, very large, broad, hooked, and serrated; foot oblong, obtusely quadrate in front, rounded behind.*—5 species; also fossil.

Delicate shells completely buried in the large mantle of the animal, consequently devoid of any colour. Found on the British shore, also on those of New Zealand, the Philippines, the Mediterranean, &c.

Section II.

The animals of the following families have no distinct breathing tube, and the eyes are placed at the base of the tentacula. The shells have no notch or canal, with the exception of Cerithium and Melanopsis, but they cannot be included in the foregoing families.

Family 11. — *TURRITELLACEA.*

The animals have a snout-shaped head, two long tentacula, on the outside base of which, the eyes are placed; the mantle is fringed at the edge; the tongue is small, linear, in the middle one row of teeth, and on each side it is beset with three rows of hooks. The shell is turret-shaped, with numerous whorls, the aperture oval, or rounded, the lower part of a few having a notch or even a canal; the horny operculum varies in character.

Turritella. *Lam.* (Haustata *Montf.*; Terrebellum

* Forbes's British Moll.

Gray.)—*Shell* very long, needle-shaped, with numerous whorls, usually spirally grooved; aperture rounded, entire, margin thin; no umbilicus; operculum horny, formed of many whorls. *Animal* with a muzzle-shaped head, bearing two long subulate tentacles, having eyes on their external bases, slightly prominent; foot very short in proportion to the shell, truncate in front, rounded behind, grooved beneath; opercula lobe occupying the caudal disk, not cirrhated nor winged; mantle with a fringed margin, obscurely siphonated at the right side; branchial plume single, very long; tongue very short, each series of denticles consisting of a subquadrate medium, with an incurved denticulated apex, and of three similar ligulate uncini on each side, all with hamate serrulated summits.* — 65 species †; also fossil.

Turritella communis.

These shells are found in India, Africa, and Europe; many of the foreign species attain a large size, some having been found four inches and a half long, the whorls varying from fifteen to thirty in number.‡ They are more or less striated, but none are known to possess vertical ribs, thickened bands, or tubercles. Forbes says that the animal, when full grown, does not fill up the entire length of the shell, but partitions off part of the spire. *T. communis* is the British species.

PROTO. *Defrance.* — *Shell* turret-shaped, with numerous flat whorls, having a line extending parallel to the suture, as in some *Terebra;* the aperture is oblique, rounded, enlarged, the edges not connected: the outer lip

* Forbes's British Moll. † Reeve's Iconica.

‡ Reeve.

truncated and notched below; but for this it would resemble Turritella. — Fossil.

Murchisonia bilineata.

MURCHISONIA. *D'Archiac* and *De Verneuil.* —*Shell* turret-shaped, usually furnished with keels, or knobs; aperture oblong, sometimes rounded, sometimes with a short or truncated canal; the inner lip is mostly curved; a more or less deep cleft in the outer lip, which has almost parallel edges. — Fossil.

These shells are very like some of the Pleurotomacea.

CERITHIUM. *Adanson.* —*Shell* turreted, many whorled, elongated, rough and tuberculated; aperture oblong, obliqus, and having a recurved canal at the base, and a notch at the upper part of the right lip; operculum small and horny. *Animal,* head thick and muzzle-shaped, having two awl-shaped tentacula, and eyes on a swollen portion near the base; foot short and rather triangular.—Above 100 species; also fossil.

Cerithium aluco.

The Mollusca forming these shells chiefly inhabit the Indian and Pacific Oceans, the Red Sea, &c.; they appear to have the power of remaining for a considerable period out of their natural element, and without food, which is proved by the following fact: — Two specimens containing the animals belonging to one of the species of this genus, were brought from the Mauritius; they had drawn themselves far within the shell, and remained in that state during the voyage; but on arriving in England and

being placed in sea water, immediately recovered from their inanimate state, apparently uninjured.

The *Cerithium giganteum* is more than a foot in length, and the only known specimen in existence is in the cabinet of Lamarck*; it was fished up by an English sailor in the neighbourhood of New Holland, and is, of course, a recent shell. There are fossil specimens of this species, even larger than the recent *giganteum*, found at Grignon near Paris.

The surface of these shells is rarely smooth, being generally covered with spines or prickles; the regularity of these projecting parts might furnish a sculptor with models for innumerable designs in ornamental architecture. They inhabit the sea; but many live in salt marshes, or at the mouths of rivers; they are occasionally found suspended from the branches of trees by silken threads.

Philippi mentions the following as sub-genera: — Potamides *Brongn.;* and Lampana *Gray.*

Triforis. *Deshayes.* — *Shell* turret-shaped, sinistral, composed of many whorls; the aperture almost circular, with a short, completely closed canal at the base, another at the upper part, and occasionally a third, which forms part of a varix. — 2 species; also fossil.

Triforis perversus.

The recent species are found in the seas of Australia, and also of Norway. This genus as nearly resembles *Cerithium*, as *Typhis* does the *Murex.*

Family 12. — *PALUDINACEA.*

The animals have a short, truncated, and non-retractile snout; the tentacula are long and slender, with the eyes

* Now that of the Duc de Rivoli.

at the outer base; the tongue is slender, long, and linear, having in the middle a row of teeth, and on each side three rows of hooks, and lying partly in the intestinal cavity. The shell is spiral, of various forms, with a notch or canal, or entire at the base. Either marine or fluviatile.

PALUDINA. *Lam.* (Viviparus *Cuvier;* Vivipara *Lam.*) — *Shell* turbinated, having the whorls rounded; aperture roundish, angulated above; margins of the lips united; covered with an olive epidermis; operculum horny. *Animal,* with a lengthened muzzle, head bearing two tentacula, the extremities of which are setaceous, but the bases thickened by the union with them of the eye peduncles; tentacles of the male unequal; mantle ample; a small veil on each side of the neck; foot large, oblong, triangular, obtuse, and not grooved behind; bearing on a rounded lobe an operculum, which is corneous and composed of concentric elements round a central nucleus; branchial plume single, concealed; tongue very short, armed with a transverse series of denticles, each composed of an ovate, central denticle, flanked on each side by three oblong lateral uncini, all with crenated apices.* — 60 species; also fossil.

Paludina Listeri.

This genus is distributed all over the world, and is usually found in fresh waters, rivers, and ponds; there are, however, some species found in salt marshes, but none in the sea. The British species are two, *P. vivipara* and *Listeri.*

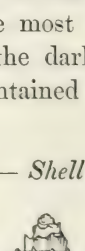
In Sussex there are extensive beds of marble almost wholly formed of fossil Paludina. That called Petworth, or Sussex marble, is principally made up of one species, *P. fluviorum;* and Dr. Mantell says, "it is an aggregation

* Forbes's British Moll.

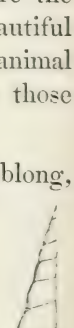
of Paludina, held together by crystallised carbonate of lime; the cavities of the shells, and their interstices, being often filled with white calcareous spar. The Wealden limestone of the Isle of Purbeck, known as Purbeck marble, is in like manner composed of Paludina, but of a much smaller species. Both these marbles were in great repute with the architects of the Middle Ages, and there are few churches or cathedrals which do not contain examples, either in their columns, monuments, or pavements, of one or both varieties. The polished marble columns of Chichester Cathedral, and those of the Temple Church in London, are of Purbeck marble; in other words, they are composed of the petrified shells of snails that lived and died in a river flowing through a country, inhabited by the Iguanodon and other colossal reptiles, all of which have long been extinct."*

The dark patches and veins in these marbles are the animal remains of the Paludina, and the most beautiful slabs of Sussex marble are formed of the dark animal matter, and the white calcareous spar contained in those shells which were empty.

Melania. *Lam.* (Melas *Montf.*) — *Shell* oblong, either turreted, globose, or oval; exterior wrinkled, and the whorls often ribbed, sometimes surmounted with spines or knobs; aperture pear-shaped, in some a canal at the lower part; the apex sometimes broken off in the adult; almost all have a brown or black epidermis; operculum horny. *Animal*, outwardly differing very little from the Paludina, according to Fer-



Melania amarula.



Melania quadriseriata.

* Mantell's Medals of Creation.

rusac and Rang, though the snout is longer, and the edge of the mantle fringed: according to Quoy and Guimard there is only one rigid, cylindrical, compound thread-like gill existing. — About 200 species; also fossil.

Found in a great many parts of the world; abundant in Asia, but rarer in Europe. They inhabit rivers, streams, and lakes.

Philippi includes the following as sub-genera: — Ancylotus *Say;* Paludomus *Sw.;* Melanopsis *Fer.;* Faunus *Montf.;* Jo *Lea;* Melafusus *Sw.;* Tricula *Benson.*

Litiopa. *Rang.* (Bombyxinus *Belanger.*) — *Shell* not very thick, horny, with a slight epidermis, rather transparent, conical, with whorls somewhat rounded, the last being larger than all the rest together; the apex pointed, whorls longitudinally grooved; aperture oval, with the lips disunited, the right lip simple, separated from the left by a rather indistinct notch, the left lip slightly reflected backwards; no operculum? *Animal* with a small foot formed for creeping on the fuci on which it dwells; the head is lengthened into a long snout, and bears two conical awl-shaped tentacula, the eyes placed at the base. Several species; also fossil.

Litiopa bombix.

Sowerby says that the animals of this shell have the power of suspending themselves from the sea-weed on which they live, by a thread resembling a spider's web. They are found in the Atlantic and Pacific Oceans.

Planaxis. *Lam.* — *Shell* small and oval; aperture oval, and having a half-formed notch; left lip flattened, and thickened at the upper part; right lip rayed or grooved in the interior; operculum horny. *Animal*, foot short and thick; head proboscis-shaped, with two long tentacula;

Planaxis semisulcata.

eyes at the base on a thickening; very like Paludina, but having two dissimilar gills. — About 12 species; also fossil.

These Mollusca are found in India, South America, and the Isle of France, where they abound, sometimes almost covering the shores in particular spots; they are often concealed under stones. Some of the shells are transversely grooved on the exterior, but do not possess much beauty.

Quoya. *Deshayes.* (Leucostoma *Sw.*)—*Shell* turret-shaped, often decollated; aperture large, notched; the columella on the upper part has a fold at right angles to it, otherwise it does not differ from *Planaxis*. *Animal* outwardly like that of *Planaxis*. — 1 species.

Quoya (*Planaxis*) *decollata* is from New Guinea.

Macrocheilus. *Phillipps.* — *Shell* thick, ventricose, like a Buccinum; aperture simple, effuse below; outer lip thin, inner wanting; columella callous, slightly tortuous.* — 12 species fossil.

Holopea. *Hall.* — *Shell* conical, ventricose, more or less oblique, or nearly straight; aperture roundish oval; the lips entire, the outside marked with lines of increase, or cross-barred. — Fossil.

Shell greatly resembling Paludina.

Rissoa. *Fréminville.* (Cingula *Flem.;* Loxostoma *Bivona.*) — *Shell* small, of various colours, oblong, turreted; no umbilicus; generally remarkable for its longitudinal bands, but sometimes spirally grooved, or even smooth; aperture oval, oblique; the two lips united, the right not reflected, but thickened; a horny operculum of few whorls. *Animal*, having a produced, muzzle-shaped head, with two long setaceous tentacula, bearing eyes on protuberances near their external bases;

Rissoa.

* Woodward's Recent and Fossil Shells.

no neck lobes; operculigerous lobes, with developed lateral expansions, and in numerous species with a caudal filament; foot usually subangulated in front, acute behind, in some species rounded at both ends; lateral elements of the tongue dissimilar, all with denticulated apices; median denticle and its flanking laterals very broad, and with lobed incurved apices.* — 80 species; also fossil.

The species of this genus are all small shells, and are remarkably beautiful both in colour and form; there are 28 species found on the sandy shores of Great Britain, and others come from the Mediterranean, the seas of Senegal, North America, and the West Indies.

JEFFREYSIA. *Alder.* — *Shell* minute, transparent, conical, aperture ovate, rounded below, lips thin and united; operculum horny, with a curious projection. *Animal,* head elongated, deeply cleft; tentacula four, and flattish; the eyes very prominent, but far behind the tentacula; foot two-lobed in front; the tongue has a broad middle notched tooth, and two lateral teeth on each side. — 2 species.

Jeffreysia diaphana.

Found on sea-weeds, near low water, on the British coasts; the shells greatly resembling Rissoa, but the animal differs principally in the eyes, which are constantly seen through the transparent shell; also in the operculum, which is semicircular, imbricated, with a strong rectangular projecting plate from the straight side.

RISSOINA. *D'Orb.* — *Shell* turreted, almost entirely like Rissoa, mostly ribbed longitudinally, the aperture oval, having at the lower part a canal; the operculum is

* Forbes's British Moll.

calcareous, having a tooth-like process inside like that of *Nerita*. *Animal* unknown.—1 species; also fossil.

Rissoina Inca is brought from Peru.

LACUNA. *Turton.*—*Shell* turbinate, solid or thin, obliquely conoidal, or subglobular, spire short or produced, surface smooth (in the British species), protected by an epidermis; mouth ample, rounded, peretreme entire, not continuous, outer lip sharpened, columella lip expanded, grooved, umbilicated; operculum semicircular, corneous, of few rapidly increasing whorls, the spiral nucleus lateral, and subterminal.* *Animal*, having a muzzle-shaped head, with two long tentacula, bearing eyes on bulgings at their external bases; no neck lobes; operculigerous lobe expanded or winged laterally, and furnished behind with two filamentary processes, more or less developed, but sometimes nearly obsolete; foot rounded at both extremities, contracted at the sides, centrally grooved; branchial plume single; lateral elements of the tongue heterogeneous, two of the uncini, as well as the median denticle, with incurved (five) denticulated apices.†—About 12 species; also fossil.

Lacuna.

Found on the shores of the North Sea; four British species, found principally on the northern shores.

FOSSARUS. *Philippi.* (Forsar *Gray;* Maravignia, *Aradas;* Phasianema *Wood.*)—*Shell* semi-globular or egg-shaped; umbilicated; aperture entire, semicircular; inner lip striated; operculum horny, not spiral. *Animal*, having the head lengthened into a muzzle; two long tentacula, with the eyes at the outer base, two frontal lobes; foot without an appendage.—2 species; also fossil.

Fossarus sulcatus.

From the Mediterranean and Senegal.

* Forbes's British Moll. † Ib.

ADEORBIS. *Wood.* — *Shell* semi-globular, deeply umbilicated, and furnished with few rapidly increasing whorls; the aperture large, oblique in reference to the axis of the shell, oval or semi-globular, the lips slightly separated. Forbes says the operculum is testaceous and multispiral. Several species; also fossil.

Adeorbis subcarinatus.

Brought from the W. Indies and China, and one small species, *A. subcarinata*, found on the British shores.

SKENEA. *Flem.* — *Shell* very small, spiral, flat, and of few whorls, deeply umbilicated; mouth entire, circular, not quite connected with the body whorl; operculum rather spiral. *Animal* nearly like that of Rissoa; it has large eyes. — Few species; also fossil.

Skenea planorbis.

Found on the shores of Britain and other northern states, generally on the roots of *Corallina officinalis.* Forbes remarks that the shells may be called discoid Rissoa.

ORBIS. *Lea.* — *Shell* discoidal, with flat quadrate whorls, aperture square; in other respects resembling Solarium. *Animal* unknown. (A minute fossil, *Sow.*)

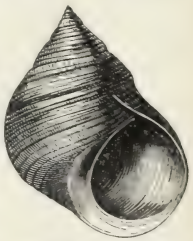
Philippi mentions one small species, *O. foliaceus*, found in the Sicilian seas, which resembles one of the Foraminifera.

ASSIMINEA. *Leach.* — *Shell* rather oval, light, thin, covered with a horny epidermis, spire produced into an acute pyramid; whorls slightly angulated in the centre, rounded beneath; aperture elliptical, slightly modified by the last whorl; inner lip flattened; outer thin; operculum horny, sub-spiral. *Animal*, having the eyes at the tips of

the tentacula; otherwise like Litorina. Forbes has the following description of this animal: — "A muzzle-shaped head, with two rather short tentacula, bearing the eyes at the *tips;* no neck lobes; operculigerous lobe without filamentary processes; foot rounded at both ends; lateral elements of the tongue dissimilar, all with denticulated apices; median denticle with extended lateral crura curves, and a prominent basal process."

A Grayana is found in brackish water in the Thames. There are Indian and Chinese species.

LITORINA. *Fer.*—(Trochus *Adanson;* Turbo *Lin.* part, and Phasianella *Lam.* part.) — *Shell* thick, with but few whorls; aperture rather round, acute at the upper part: inner lip rather flat, no umbilicus; outer lip acute, thickened within; surface smooth, or spirally grooved; operculum horny, rather spiral. *Animal,* head with a short round snout; the eyes at the base of the tentacula on protuberances; foot rounded at both extremites, grooved below; tongue with lobed and denticulated tops to the teeth. — Nearly 100 species; also fossil.



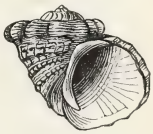
Litorina litoreus.

The *Litorina litoreus,* or common periwinkle, is used by mankind as an article of food, and is found on the shores of England in great numbers. In Sweden, where they also abound, they serve to prognosticate the approaching state of the weather; the peasants having observed, that whenever the periwinkles ascend the rocks it is a sure sign of a storm being near, as their instinct teaches them to place themselves out of the reach of the dashing of the waves; on the contrary, when they make a descent upon the sand it is an indication of a calm. In

hot countries some species are often seen on the trees near the coast, and on the rocks elevated above the surface of the water; they remain stationary on the latter during the hottest hours, even when it is painful to walk on them from their great heat: they leave the water early in the morning, but return at night. These circumstances prove that, although marine, many species are amphibious. They seem to exist between the tide marks. Woodward mentions that *L. rudis* places itself in situations where it is scarcely reached by the tide; it is viviparous, and the young have a hard shell before they are hatched.—About 9 British species are known; others are found in various parts of the world.

Philippi mentions *Nina* Gray, and *Tectus* Montf.; as sub-genera.

Modulus. *Gray.* (Monodonta *Sow.*, not *Lam.*)—*Shell* orbicular, strongly curved, umbilicated or not; mouth round or rhombic; inner lip with an acute tooth, or separated from the outer lip by a deep notch; the operculum circular, thin, (with numerous whorls?) and a central nucleus. *Animal*, with a very long snout, the tentacula having the eyes half way up, no frontal lobes; the foot simple, with no side appendages.—Few species; no fossils.



Modulus tectum.

From the seas of the Torrid Zone.

Risella. *Gray.* (Bembicium *Phil.*)—*Shell* shaped like a *Trochus*, with a flat angular or concave base; the whorls keeled, aperture rather square, compressed; generally dark coloured or variegated; operculum partly spiral. *Animal*, with a snout-formed head, length-

Risella nana.

ened tentacula, with the eyes at their base, no frontal lobes; the foot simple, no appendages.—8 or 10 species.

Natives of New Holland. The type is *Trochus melanostomus.*

Solarium. *Lam.* (Architectoma *Bolton.*)—*Shell* nearly discoid; whorls sharp round the outer edge; not pearly; internal edge of the whorls visible in the umbilicus, which is very wide; aperture almost square, margin thin. *Animal* with a short contractile snout, two cylindrical feelers connected at the outer base, where there is a distinct thickening for the eyes; the foot has no appendage. Operculum horny and spiral.—25 species; also fossil.

Solarium perspectivum.

The various species of this genus are brought from the coasts of New Holland, Tranquebar, and from the Indian and Chinese seas; they also frequent the shores of the Mediterranean, near Alexandria. The *Solarium perspectivum*, represented in the figure, is frequently called the Staircase-shell. Specimens have been found three inches in diameter; and as they are elegantly marked with black and straw colour, they are often very beautiful objects.

Bifrontia. *Deshayes.* (Schizostoma *Browne*).—*Shell* discoidal, planorbicular, with whorls sometimes not contiguous; umbilicus deep, keeled at the margin; aperture sub-triangular, somewhat dilated; outer lip acute, separated by a deep notch at both extremities. (*Sow.*)—Fossil.

Greatly resembling the genus Solarium; but there are no living species.

Valvata. *Müller.* — *Shell* spiral, raised, or flattened; umbilicated; whorls round and distinct; mouth round or nearly so, with the lips united and acute; a horny operculum, concentrically spiral. *Animal*, having a distinct head, with a muzzle; and furnished with two very long tentacula, with sessile eyes at the base; foot two-lobed in front; branchial plume long, pectinated; tongue having a central line of broad teeth, which are hooked, and three rows of side teeth. — 11 species; also fossil.

Valvata piscinalis.

Found only in slow running rivulets and ponds, upon plants, in Europe and North America. — There are two British species.

Family 13. — *SCALARIACEA.*

The animals have the head prolonged into a snout, two long slender tentacula, at the bottom of which the eyes are situated; the tongue has numerous rows of teeth. The shell is for the most part spiral and turret-shaped, the aperture entire, the lips united and thickened. Marine.

Scalaria. *Lam.* (Clathrus *Oken.*) — *Shell* turreted, sometimes without a pillar; mouth nearly round, lips united and thickened; longitudinally banded the whole length of the shell, formed by the thickened lips of former mouths; operculum horny, spiral, and thin. *Animal*, having an angulated lunate head, with two approximated long pointed tentacula, eyes immersed at their external basis; mouth inferior, with a retractile trunk, mantle a rudimentary siphonal fold, simple edged; foot obtusely triangular, not

Scalaria pretiosa.

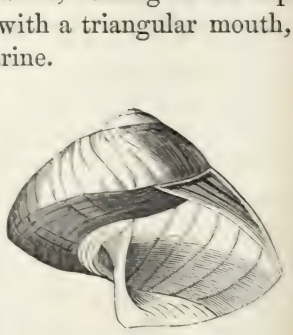
cirrhated posteriorly, grooved below, furnished in front with a fold or mentum.* — About 100 species; also fossil.

In these shells it is easy to distinguish the different periods of growth, as the mouth is always bordered by a thick lip, which is retained, and produces a band; in the adult shell these are very numerous, and from their appearance have given the name to the genus, *Scalaria* or *Staircase.* The seas of China and Japan produce the rare species *Scalaria pretiosa,* for fine specimens of which, $3\frac{1}{2}$ inches in length, formerly the enormous price of one hundred guineas has been given; they are now, however, much more frequently met with, and may be obtained for a few shillings. In this species the whorls only touch each other at the thickened lip, and occasionally a specimen is found, in which they are perfectly separated. The *Scalaria communis* inhabits our own coasts.

Family 14. — *JANTHINACEA.*

The animals have a small foot, not adapted for creeping, behind which is fixed an apparatus, acting as a bladder, by means of which the animal swims, floating on the top of the water. The shell is thin, with a triangular mouth, and perpendicular inner lip. Marine.

JANTHINA. (*Lam.*) — *Shell* sub-globular, whorls slightly angulated; right lip forming an angle at the lower part of the aperture with the columella, which is produced so as to meet it; very fragile, thin, and of a purple colour. *Animal,* head large, muzzle-shaped; two ten-



Janthina communis.

* Forbes's British Moll.

tacula, which are thick, cylindrical, long, and having a somewhat small feeler-like appendage at the base; and, according to M. Rang, with eyes at the tips; the foot has a vesicular or bubble-like apparatus or float, which prevents the animal from crawling, but enables it to float on the surface of the water with the shell downwards. — 6 species.

The species *J. communis, pallida*, and *exigua* are found on our coasts and those of Ireland (in consequence of the gulf streams and westward winds), but they are inhabitants more especially of mid-ocean. Other species are brought from the Mediterranean and Madagascar. They are seen in immense numbers together floating on the sea, suspended by the curious float, and they emit a violet-coloured liquid when they are touched or injured. The eggs are attached to the under side of the float; and Dr. Coates remarks, "that the animal seems to occupy considerable time in the deposition of its eggs, the bags nearest to the extremity of the float being constantly found empty, while the central ones contain young shells fully formed, and those towards the animal are filled with eggs."* This float is too large to be drawn into the shell; it remains on the surface of the water; indeed it is said that the animal has not the power of sinking.†

Family 15. — *STYLINACEA.*

The animals of this family have a small rudimentary foot, a cup-shaped mantle, and two round thick tentacula. The shell is glossy, globular, irregular, with a tapering pointed apex; the aperture is oval, pointed above, the lips not connected, the outer lip sharp and sinuated, or waved; no operculum. — Marine.

* Forbes's British Moll.

† Woodward's Recent and Fossil Shells.

STYLINA. *Flem.* (Stylifer *Brod.*)—*Shell* very thin; globular generally, apex pointed, and often bent; aperture rather ovate, pointed above, rounded below; the outer lip sharp and sinuated. *Animal*, with slender cylindrical tentacula, the eyes small and immersed at their external bases; mantle (according to Broderip) thick, fleshy, reflected on the last whorls of the shell; foot ample, long, linguiform, produced and provided with a conspicuous mentum in front; tongue unarmed; a single branchial plume.*—6 species.

Stylina asterícola.

Small delicate shells found in the W. Indies, &c., living in star-fish and corals. "Mr. Cuming found this elegant parasite burrowed in different parts of the rays of the oval disc of *Asterius solaris*. It is almost hidden from sight, so deeply does the animal penetrate into the substance of the star-fish, in which it makes a comfortable cyst for itself, wherein it most probably turns by the aid of its rudimentary foot; all the specimens infested with Stylini appeared to be in the best health, though there is reason to believe that they feed upon the juices of the star-fish. With that instinct of self-preservation imparted to all parasites whose existence depends on that of their nidus, the Stylina, like the Ichneumon amongst insects, appears to avoid the vital parts; for in no instance did Mr. Cuming find it embedded anywhere, save in the rays, though some had penetrated at their base, and very near the pelvis. When extracted, the older shells have much the appearance of a milky clouded glass bubble; the younger shells are of an unclouded transparency."†

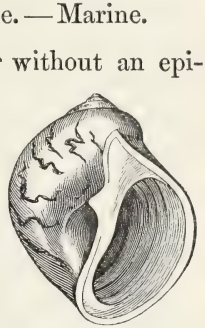
One species, *S. Turtoni*, has also been found on the British coasts by the indefatigable researches of several naturalists.

* Forbes's British Moll. † Sowerby's Genera of Shells.

Family 16.—*NATICACEA.*

The animals have an enormously large foot, the front part of it is thick, and drawn over the shell; the snout-formed head is concealed, the tentacula are remote, the eyes wanting. The shell is oval, globular, or compressed, with the whorls increasing quickly; the aperture entire, in the shape of a half circle; the outer lip sharp; the operculum small, or a perfect one, or none.—Marine.

NATICA. *Adanson.*—*Shell* smooth, or without an epidermis, more or less globular, strong, with but few whorls, and an umbilicus, which is, however, in some species covered by a coating of shelly matter; outer lip sharp, semicircular, inner lip and inside smooth and thickened; operculum shelly or horny, and sub-spiral. *Animal*, very large in proportion to the shell, but always perfectly retractile; head small, furnished with a long trunk, surrounded by a tentacula veil, from which spring two lanceolate tentacles, set well apart; eyes usually absent, when present very minute, and placed beneath the tentacula veil; foot very large and expanded, rounded at both ends; mentum greatly developed, forming a large oblong disk in front of the shell, the anterior portion covering the foot, the posterior reflexed upon the head and tentacula, so that the tips only of the latter appear above when the animal is walking; operculigerous lobe very ample, reflexed upon, and partially concealing the shell both at the sides and back; jaws distinct, corneous; tongue short, linear, each row of teeth upon it consisting of a quadrate broad-based median tooth, with a denticulated apex, flanked by three



Natica.

uncini on each side; branchial plume single.* — About 100 species; also fossil.

Found on the coasts of India, China, New Holland, England, &c. About seven are British. The animals are said to be carnivorous, living on small bivalves. The masses of eggs of this genus appear to be very curious; Forbes describes them as in the form of a spiral ribbon or strap, rendered firm by agglutinated sand.

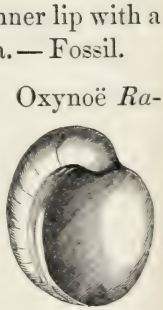
CERNINA. *Gray.* (Globularia *Sw.*; Anomphala *Jonas.*) — *Shell* globular, no umbilicus, inner lip thickened, so as to cover part of the last whorl; aperture like Natica. *Animal* and operculum unknown. — 1 species; also fossil.

Cernina fluctuata.

A genus made for the pretty *Natica fluctuata.*

DESHAYSIA. *Raulin.* — *Shell*, having the inner lip with a toothed edge, therefore removed from Natica. — Fossil.

SIGARETUS. *Lam.* (Cryptostoma *Blain*; Oxynoë *Rafin.*; Stomatia *Browne.*) — *Shell* ear-shaped, aperture very large, right lip thin; not pearly inside; operculum horny and very small. *Animal* exactly like Natica, only still larger in proportion to the shell, within which it cannot entirely draw itself. — 26 species; also fossil.



Sigaretus haliotoides.

The species are brought from the Indian seas, both East and West; and Africa. The shell is almost hidden within the mantle, and from this cause probably, is devoid of colour; some species are solid and thick, others thin.

* Forbes's British Moll.

M. Adanson found abundance of these shells separated from the animal in the sand at the mouth of the Niger.

AMAURA. *Möll.* — *Shell* a lengthened oval, not umbilicated; spire lengthened; the aperture pear-shaped, and half as long as the shell; operculum thin and horny. *Animal* with a small foot, which is neither longer nor broader than the shell, the front part deeply notched; the eyes are under the skin. — 1 species.

A. candida is found on the Greenland coasts; it greatly resembles *Natica canaliculata.*

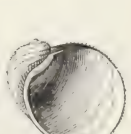
LAGUNCULA. *Benson.* — *Shell* spiral, globular, with an aperture large, entire, and rather long, the lips not completely joined; a deep winding umbilicus. *Animal* unknown. —1 species.

L. pulchella from China.

Family 17. — *VELUTINACEA.*

The animals have a long retractile proboscis, rather short tentacula, which, [according to Loven,] are connected by a membrane, with the eyes at the base; the edge of the mantle very thick; the tongue has in the middle a row of teeth, and on each side three rows of hooks. The shell is of various forms, with a strong horny epidermis, which often forms a hairy fringe; the aperture is oval, or nearly round and entire, or forming an angle with the inner lip; no operculum, or only a small one, not sufficient to close the aperture.—Marine.

VELUTINA. *Gray.* (Galericulum *Brown;* Oxinoë, *Couth.*) — *Shell* thin; spire short, the suture very deeply marked; whorls few, the last very large, aperture round and large, outer lip sharp. *Animal*, foot large, head broad, tentacula awl-shaped, blunt; eyes at the base

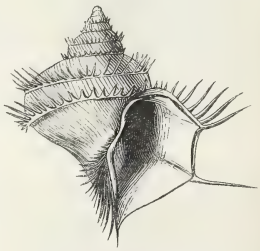


Velutina lævigata.

on prominences; proboscis retractile, mouth armed with jaws, and a denticulated tongue, armed with a single series of broad, hooked, serrated central teeth, flanked on each side by a triple series of laterals, of which the two outer rows are simple and even edged, and the inner ones broad, hooked, and serrated; mantle ample, thick, more or less reflected on the shell all round.* No operculum. —4 species; also fossil.

Inhabiting rocks in the seas of Britain, and other northern countries.

TRICHOTROPIS. *Brod.* and *Sow.* — *Shell* turbinated, thin; spire rather raised, and the whorls keeled; umbilicus large; aperture ovate; the columella lip arched, ending in a point, the outer thin and sharp; the whole shell covered with a horny epidermis, which extends into a row of fine bristles on the keel; the horny operculum has the nucleus at the side. *Animal* with a short broad head, flanked by subulate tentacles, set wide apart, bearing the eyes at the extremities of their thickened lower halves; mouth inferior; proboscis long, retractile; tongue with a single series of hooked and serrated central denticles, flanked by three rows of curved laterals on each side, of which the innermost only are serrated; siphon scarcely exserted, distinct; margins of mantle simple, not reflected; foot broad, quadrate in front, rounded, but not produced behind.† —10 (?) species; also fossil.



Trichotropis bicarinata.

Very few specimens of this remarkable shell have been found. One, with its inhabitant, was brought from the

* Forbes's British Moll. † Ibid.

Icy Cape by Captain Belcher, R.N. Two species are named, *T. bicarinata* and *unicarinata;* some are taken on the coasts of Scotland, Ireland, and Northumberland.

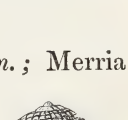
Calcarella. *Souleyet.* — *Shell* almost globular, horny, transparent, with three strongly marked keels, which are far apart, and toothed; the teeth are slender, triangular, and regular; the whorls consist of three smooth convolutions, and a mammeliformed apex; the aperture is three-sided, rather crescent-shaped; the outer lip has three points; the columella lip is thickened and sinuated. *Animal* unknown. — 1 species.

Calcarella spinosa is from the South Seas.

Family 18. — *NARICACEA.*

The animal has a snout-formed head, spindle-shaped tentacula; between the head and foot an appendage like that of Lithedaphus*, and on each side of the foot is a horizontal projecting flap, ending in a point. The shell is half globular, white, ribbed, cross-barred or granulated; the aperture entire; lip simple; operculum smaller than the aperture. — Marine.

Narica. *Recluz.* (Vanicoro *Quoy* and *Gaim.;* Merria *Gray;* Leucotis *Sw.*) — *Shell* semiglobular, always white, striped, ribbed, or cross-barred; spire short; the aperture almost half circular; the edges of the aperture not connected; the outer lip simple, the inner tolerably straight; at the back of it a simple umbilicus; operculum small, not closing the aperture. (Woodward says a velvety epidermis.) *Animal,* with a snout-formed head, fusiform tentacula, with small eyes on the outer base;



Narica cancellata.

* Of Owen. See genus *Mitrularia,* in Family 20.

between the head and foot an appendage proceeding from the mantle; and on each side of the foot a horizontal broad wing, extending in front into a point; the single gill is large, and formed of free lobes. — 21 species (Recluz.); also fossil.

Very pretty shells from the Torrid Zone.

Neritopsis. *Grateloup.* — *Shell* ovate, with a very short spire of three or four whorls, increasing very rapidly in size; the exterior generally rough, with rows of beadings; aperture entire, orbicular; the lip thickened within, the outer edge sharp; the columella has a notch near the middle, which distinguishes it from Natica, to which in other respects it is very similar. *Animal,* unknown. — 1 species; also fossil.

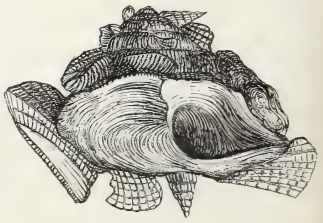
Neritopsis radula.

N. radula is a very pretty shell from the Pacific.

Family 19. — *XENOPHORACEA.*

The animals have a long extended snout, long tentacula; a small foot, which may be called stalked, scarcely equal to creeping. The shell is trochiform, and is remarkable for having foreign bodies adhering to its spire; the aperture is very oblique; the outer lip very thin and sharp; operculum oval, with radiating lines of growth. — Marine.

Xenophora. *Fisch.* and *Waldh.* (Phorus *Montf.*) — *Shell* orbicular, rather conical; spire obtuse; edge of the whorls ornamented with hollow spines, or with fragments of shells and stones; aperture depressed; lip acute;



Xenophora agglutinans.

operculum thin and oval. *Animal,* described in the family.—9 species*; also fossil.

The first species known of this interesting shell was named *Trochus agglutinans,* from the peculiar property mentioned above. For some time the genus has been known under the name of Phorus of Montfort; but Philippi has revived an older name, and, according to the right of priority, by that it should now be known. *X. onustus* is an inhabitant of the West Indies, and is remarkable for the singular habit of accumulating, during the formation of its shell, different substances, which adhere to it. It is found covered with fragments of all kinds, and on account of this curious propensity it has been named the Carrier: it has been supposed that this is done for the purpose of strengthening the shell, which is very thin and brittle; and that the substances collected are made to adhere by bringing the part of the shell into contact with them whilst the shelly matter is still in an unhardened state. Mr. Reeve illustrates a very curious specimen of this species in his interesting monograph on this genus. It is covered so thickly with a number of shells of the genus Cerithium, that the original can scarcely be seen on the upper side; looking more like a mass of these shells lying carelessly in all directions, intermixed with a few stones and bivalves. *X. exutus,* on the contrary, exhibits very few indications of having had any foreign substances adhering to it. *X. corrugatus* is often much loaded with small pieces of shell at the edges of the whorls. *X. solaris* is a very beautiful shell; when young it bears a few stones on the whorls, but afterwards is ornamented with a row of long, hollow, spouted tubes, which give it a very remarkable appearance.†

* Reeve's Iconica. † Ibid.

Family 20. — *CALYPTRÆACEA.*

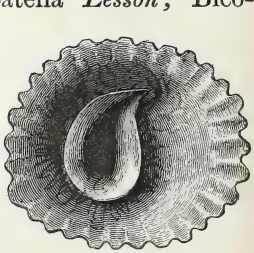
The animals have the head lengthened, cloven, and snout-formed; two long tentacula, with the eyes at the base; the tongue membrane is on the front part, winged on each side, and the wings below are united; in the middle line a row of teeth, and on each side three rows of hooks. The shell is not symmetrical, never accurately regular. — Marine.

Dispotæa. *Say.* (Calypeopsis *Lesson;* Bicatillus *Sw.;* Calyptræa *Lam.* part.) — *Shell* conical, cup-shaped, more or less elevated, with a circular base; not spiral, but with a central apex, from which in the interior proceeds a horn or cup-shaped appendage, which is connected with the right side of the shell.

Dispotæa.

This genus embraces the *Calyptræa auriculata, rugosa, imbricata, quirquina,* &c. of the Pacific. They are also found in the fossil state.

Crucibulum. *Schum.* (Siphopatella *Lesson;* Biconia *Sw.;* Calyptræa *Lam.* part.) — *Shell* conical, cup-shaped, mostly elevated, without whorls, with nearly circular base; apex central, from which in the interior is suspended an appendage, which is connected with the right side, entire at the edge, but compressed on one side.



Crucibulum rude.

Generally found attached to other shells, in the seas of America, Japan, &c.

Mitrularia. *Schum.* (Cemoria *Risso;* Calyptræa

Lesson; Lithedaphus *Owen;* Calyptræa *Lam.* part.) — *Shell* conical, cup-shaped, with circular base; no whorls, but the apex mostly elevated considerably; in the inside hangs an appendage in the shape of a horn, which is open throughout in the front, and fastened on the right side. *Animal* having between the head and foot a second foot resembling a prolongation of the mantle; the gills are furnished with short parallel rows of conical processes.

Mitrularia Dillwynnii.

Mitrularia (Calyptræa) *equestris* is the type of this genus. The animal, according to the discovery of Mr. Cuming, forms a calcareous plate on the place on which it rests its shell, like Hipponyx. Mr. Reeve says on this subject, "Mr. Cuming has lately found at the island of Zebu, one of the Philippines, several specimens of *Calyptræa equestris* on masses of dead coral about low-water mark, having a testaceous plate attached to the mass, to which the true shell adheres. The edges are finely crenulated, and turned up all round, like a platter, as if to protect the margin of the cap-shaped shell which rests within it."*

Trochita. *Schum.* (Sigapatella *Lesson;* Infundibulum *D'Orb.;* Trochus *Lam.* part.) — *Shell* conical, with circular base; the apex nearly central, and having several windings; within there is always a horizontal partition, which may be called a prolongation of the columella. *Animal,* uniformly pale yellow; foot obliquely long, equally two-lobed in

Trochita.

* Reeve's Conch. Systematica.

front; tentacula long, the eyes placed at less than one-third of their length.

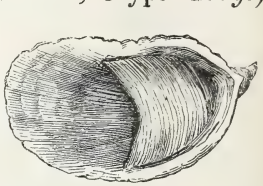
The type of this genus is *Calyptræa radians* of Deshayes.

GALERUS. *Gray.* (Calyptræa *Lam.* part.) — *Shell* conical, with circular base, and showing outwardly no windings; the axis central, and within a horizontal partition, which is obliquely spiral. The type is *Calyptræa sinensis;* the animal of which Forbes thus minutely describes: — A broad and slightly produced muzzle; tentacula two, rather short, lanceolate, unconnected, with the eyes on bulgings at their external bases; mantle with a simple edge; branchial plume single; foot suborbicular, slightly angled in front; its sides plain; tongue constituted as in Pileopsis (?).

Galerus sinensis.

The British species *G.* (Calyptræa *Lam.*) *sinensis* is abundant in the British Channel, and on our south coasts.

CREPIDULA. *Lam.* (Sandalium *Schum.;* Crypta *Gray.*) — *Shell* irregular in shape, convex at the back, but very flat; the inside partly covered with a plate, so as to resemble a half-decked boat; apex near the edge at one end. *Animal* not differing very considerably from *Galerus sinensis,* as above described by Forbes. — 25 species; also fossil.

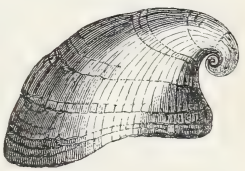


Crepidula.

This is a curious and often a very beautiful shell. The *Crepidula Onyx* is of the most brilliant black in the inside, with the little half-deck, as it may be called, of a beautiful white, and having the margin of the shell tinged with a rich brown. These shells are found on rocks, and

are often of a very irregular outline at the circumference; like the *Patella*, they constantly remain upon the same portion of rock, and form the margin to agree with its shape. They are found in great abundance at the Cape of Good Hope and California. One species frequently fixes itself upon other living shells, particularly upon the *Purpura*, and of course follows it in all its movements.

Capulus. *Montf.* (Pileopsis *Lam.*; Amalthea *Schum.*; Actita *Fisch.*; Acroculia *Phil.*)—*Shell* irregular, conical, dilated at the aperture; the apex lengthened, and spirally recurved backwards; inside dull, but having a horse-shoe shaped impression; aperture large; epidermis very soft, like velvet.



Capulus ungarica.

Animal, with a head produced into a proboscidiform muzzle; tentacula two, long, subulate, unconnected, with the eyes on bulgings at their external bases; mantle fringed at the margin; branchial plume single; foot strong, suborbicular, its sides plain; tongue rather long, with a cordate membranous border at its anterior extremity; lingual teeth arranged in transverse series of seven, of which the central one is small and broad, with a hooked apex, and the others long and hamate.* 7 species; also fossil.

These shells are frequently called, from their shape, the Fool's Cap Limpet. They are found in the European Seas principally: but some very large species are inhabitants of tropical climates, and are met with in the Pacific Ocean, and in the East and West Indies, Mediterranean, Australia, and California. The shells of this genus, like many of the species of *Patella*, are supposed to remain constantly attached

* Forbes's British Moll.

to the spot they have once fixed upon, from the circumstance that the form of the margin of the shell agrees exactly with the portion of rock on which they live, and preserves the same form to adult age. The *P. Ungarica*, the Hungarian cap or bonnet, of the British Seas, has the inside bright, and often of a beautiful rose colour; the outside nearly white, and covered with a shaggy but very soft epidermis. It is said that they sometimes form a shelly disk from the foot.

Those species which Defrance named Hipponyx are thus described and figured: — *Shell*, obliquely cup-shaped, and sometimes, perhaps generally, supported on a solid shelly plate; the shell and plate exhibit two strong muscular impressions, which are in the form of a horse-shoe. *Animal* similar to *Capulus*.

Hipponyx.

Sowerby, in his "Genera of Shells," contends that these shells are bivalves; but the opinion has not been adopted, and the examination of the animal inhabitant must at once determine the subject.

Philippi adds the following as sub-genera: — Amathina *Gray;* Hipponyx *Defrance;* Sabia *Gray.*

Brochia. *Bronn.* — *Shell* oblique, and globularly conical, bonnet-shaped; the apex is towards the back, and rolled spirally, so that the spiral part is almost perpendicular to the edge; the aperture is almost circular, at the right side there is a deep sinus; a strong fold rises between the sinus and the hinder edge, and is prolonged as far as the apex; the muscular impression is lengthened, curved, and oblique. (No under calcareous plate.) — 2 species, fossil.

SPIRACELLA. *Rang.* — *Shell* very flatly compressed, but with undulated sharp edges; apex spiral, sinistral, and twisted horizontally, lying towards the back and the left side; open on the under side; an indistinct muscular impression is seen at the back part of the shell, and appears to extend parallel to the edge. — 1 species, fossil.

PEDICULARIA. *Sw.* (Thyreus *Phil.*) — *Shell* irregular, sub-patelliform; a thick, large, obsolete apex on the longest side, and an internal callous rim within on one side only; circumference undulated irregularly. *Animal* little known, but Philippi thus describes a dry specimen: — Head placed on a long neck, and lengthened into a snout; two filamentous tentacula, at the base of which the eyes are placed; the tongue, according to Loven, is peculiarly furnished, the middle line having a row of oblique square teeth with toothed edges, and on each side are three rows of teeth, of which the first is oblique and square, the following very lengthened, slender, forming three dissimilar, curved, awl-shaped teeth. 1 species.

Pedicularia sicula.

Mr. Swainson, from whose drawing the annexed figure is taken, says he found all the specimens adhering to coral fished up on the coast of Sicily; he supposes, from the form of the shell, that it is perfectly sedentary, as it embraces the coral most closely. He named it *P. sicula.*

Family 21. — *RINGICULACEA.*

The animal is unknown of all the genera composing this family. The shell is generally globular, sometimes oval; the aperture half-moon shaped, without a canal, or notch; the outer lip generally thickened, and turned back, the inner lip having a callosity and thick plaits.

RINGICULA. *Deshayes.* — *Shell* small, globose, very solid, sinuated at the base; spire short, sharply acuminated; columella short, with a plait-like callosity at the upper part, and two strong plaits beneath; aperture small; lip remarkably thickened.* *Animal* unknown. — About 4 species; also fossil.

Ringicula.

The *Ringicula auriculata*, about the size of a pea, is found in the Gulf of Tarentum; it has a white porcellanous appearance. A fossil species from Grignon, about the same size, is an exquisite little shell; the aperture curiously formed, with the outer lip much thickened, and crenulated, the inner with a strong callosity and very prominent plaits; the spire elegantly pointed, but short; and the whorls deeply marked with transverse bands set close together.

CINULIA. *Gray.* (Avellana *D'Orb;* Ringinella *D'Orb.*) — *Shell* spherical, globular, short, with or without dotted stripes; the spire very short; the aperture half-moon shaped, compressed together, and curved, without a notch at the lower part; the outer lip is very thick, often toothed at the outer, almost always at the inner part; the edge of the inner lip is provided with three or four teeth, of which the front one is the strongest. — 22 species, fossil.

This genus is distinguished from *Cassis* by the want of a canal; it has a great resemblance to *Auricula.*

TYLOSTOMA. *Sharpe.* — *Shell* ovate, or globose, thick, almost smooth, with a moderately elevated spire; aperture half-moon shaped; the lips joined above in a sharp angle; the outer lip has inwardly a thickened

* Reeve's Elements of Conch.

edge in its whole extent, which is repeated at equal distances; the inner lip is callous, and nearly covers the entire columella. — Fossil.

Separated from *Dolium* and *Pterodonta* by the absence of a canal or notch, and from *Globiconcha* by the thick, not thin lip.

GLOBICONCHA. *D'Orb.* — *Shell* nearly globular; spire very short, even concave; the aperture half-moon shaped, curved at the base, without notch or canal; the outer lip thin, untoothed; the columella without teeth or folds.

Of this genus only fossil casts are known; but the form is so striking that its proper place is soon perceived.

Family 22. — *PYRAMIDELLACEA.*

The animals have a snout-formed flat head; two flat ear-shaped tentacula, with eyes at the base; the breathing hole wide open, and there is only one gill; a long proboscis; tongue unarmed, or only beset with rudimentary teeth. The shell is turret-shaped, with many whorls; the aperture oval, entire; the inner lip perpendicular, and often plaited; operculum horny. — Marine.

PYRAMIDELLA. *Lam.* — *Shell* turreted; columella having three plaits; outer lip thin, sometimes furrowed within; umbilicus small; no epidermis. *Animal* with a rounded foot, the border not forked, the front assuming the form of a double-lobed shield, and behind it has a furcation which answers to the larger fold on the columella; the head is flat, broad, and deeply two-lobed; the tentacula placed on the upper part, are acute, ear-shaped, and as long as the head, with the eyes on the inner side; operculum with an indentation on one

Pyramidella dolabrata.

side, which fits the plaits on the columella. — About 11 species; also fossil.

These pretty shells are found in the Indian, Australian, and American seas. *P. dolabrata*, represented above, is the best known species.

ODONTOSTOMA. *Flem.* (Odostomia *Flem.*; Jaminea *Brown.*) — *Shell* ovate, turreted, conical, with the apex rather obtuse; aperture oval, the lips not joined all round; one tooth-like plait on the inner lip; operculum horny, rather spiral, transversely striated. *Animal* resembling Turbonilla (Chemnitzia) in all its principal features (Forbes). — Many species; also fossil.

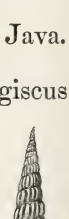
Odontostoma.

Very small smooth shells; found on the coasts of Britain and the United States. Macgillavray found ten on the coast of Scotland; and Forbes mentions that there are between twenty and thirty on the British coasts.

MONOPTYGMA. *Gray.* — *Shell* turret-shaped, transversely furrowed, the whorls even; mouth egg-shaped, with perpendicular columella. *Animal* unknown.

The type of this genus is *M. striata* of Gray, from Java.

TURBONILLA. *Risso.* (Chemnitzia *D'Orb.*; Pyrgiscus *Phil.*; Parthenia *Lowe*; Orthostelis *Arad.* et *Mag.*) — *Shell* elongated, of many whorls, ribbed in the direction of its length, often spirally striated, surface not polished; apex of the spire with a persistent embryonic sinistral shell, forming the summit; aperture oblong or subquadrate; peristome incomplete, thin but solid; columella toothless, rarely with a plication, straight or nearly so; operculum corneous, pyriform; marked by lines of



Turbonilla.

growth, and having the imperfect rudiments of a spiral nucleus at one extremity. *Animal*, with a broad head, ending in a narrow bilobed snout, furnished with a retractile proboscis; tentacula two, triangular, or ear-shaped, their inner bases connate, or nearly so; eyes placed at the inner sides of the tentacula; tongue probably unarmed; anterior and upper margin of the foot furnished with a distinct fold or mentum; foot triangularly lanceolate, short in proportion to the length of the shell; operculigerous lobe apparently simple, but, according to Loven, furnished with a minute conical process on each side.* — About 20 species; also fossil.

Elegant shells of very small size, ribbed longitudinally, and some having spiral raised lines also. There are about seven British species.

Nerinea trachea.

NERINEA. *Defrance.* — *Shell* elongated, cylindrical, having many whorls; aperture with a canal, the interior having ridges, both on the inner and outer lip. — 150 species, fossil.

No other shell resembles these, and a section presents a curious appearance from the prominent folds on the three upper angles of the subquadrate aperture.†

Family 23. — *EULIMACEA.*

The animals are imperfectly known, but are distinguished from those of Pyramidellacea by the long, slender, cylindrical tentacula. The shell is turret-shaped, formed of numerous whorls; the aperture oval and entire. — Marine.

* Forbes's British Moll. † Sowerby.

EULIMA. *Risso.* — *Shell* small, beautifully polished, and white; slender in form, with many whorls, all level; apex acute, often twisted; aperture oval, acute above; outer lip thickened internally, inner lip spread out over the pillar; operculum horny, spiral. *Animal,* foot truncated in front; proboscis long, retractile; tentacula awl-shaped, close together, with the eyes at the base. — 15 species (Sow.); also fossil.

Eulima polita.

Beautiful little shells, generally white and polished; found on the shores of Britain, India, Australia, and in the Mediterranean Sea. Forbes mentions four as British; two are white, the others ornamented with spiral brown lines; he adds, "all the animals of this genus creep, with the foot greatly in advance of the head, which is almost concealed beneath the edges of the aperture of the shell, the tentacula only protruding."

SUBULITES. *Conrad.* — *Shell* awl-shaped; the whorls broad; the suture oblique; the aperture unknown, probably like Terebra. — 1 species, fossil.

ACLIS. *Loven.* — *Shell* minute, like *Turritella,* striated or smooth, spirally twisted; aperture oval, or round; outer lip prominent, inner without folds; an operculum. *Animal,* foot truncated in front; proboscis long and retractile; tongue probably unarmed; eyes at the base of the tentacula, which are slightly swollen at the tips. — 4 species*; a few fossil.

Aclis perforatus.

Very small shells, found on the shores of England and Norway.

RISSOELLA. *Gray.* — *Shell* lengthened, oval, smooth, and in appearance not differing from Rissoa, but the

* Forbes's British Moll.

operculum is half egg-shaped, and of annular formation; the nucleus lying near the inner straight edge, and having an inner central process. *Animal*, with two blunt, cylindrical tentacula, and the angle of the region of the mouth drawn out into feeler-like processes, these two being scarcely shorter than the others; the head not muzzle-shaped in front; the eyes lie remotely behind the tentacula over the back, visible through the shell.

Rissoa glabra of Alders, from the English coast, belongs to this genus; the animal and the operculum are so peculiar that they will probably form a family alone.

Family 24. — *VERMETACEA.*

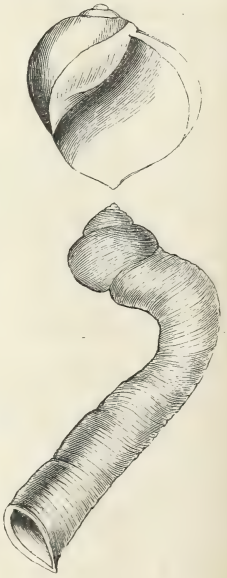
The foot of these animals is often club-shaped, and not adapted to creeping; the head has the form of a short snout, and frequently bears four feelers; the eyes are placed on the outer base; the arming of the tongue, &c., is unknown. The shell is attached, tubular, irregular; the apex only regularly spiral. — Marine.

VERMETUS. *Adanson.* (Vermicularia *Schum.;* Serpulorbis *Sassi;* Serpula *Lin.*, part) — *Shell* thin, tubular, only slightly twisted; aperture round; lips united; the interior often divided by partitions; operculum circular, concave externally; shell attached to foreign substances. *Animal*, head round in front; four tentacula, two above with the eyes externally at the base, and two below between the head and foot, which are strongly contractile; the foot projects above the head, is wart-shaped, and truncated at the end; one gill lies on the left side, and a second is rudimentary. — 1 species; also fossil.

Vermetus lumbricalis.

This very remarkable shell, both in appearance and the habits of its inhabitant, is found on the shores of Portugal, Africa, India, and also in the Mediterranean. They are often found twisted together in great numbers in the seas near Senegal. The only species, *V. lumbricalis,* has the spire generally regular in its formation, but the rest of the whorls separated, and irregularly twisted; they are attached by the pointed extremity of the spire.

MAGILUS. *Montf.* — *Shell* ventricose; spire short, consisting of three or four whorls; aperture longer than wide, without any notch, but an angle at the base; the last whorl, abandoning altogether the spiral form, produces a long tube, which is compressed laterally, especially on the side of the base of the shell; aperture elliptical. *Animal,* head small, prolonged on each side into two short tentacula; eyes at the base; proboscis obtuse; foot muscular; operculum horny. — 2 species.



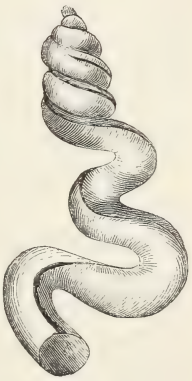
Magilus antiquus.

When in the young state this curious shell presents all the characters of a regular spiral univalve. The animal establishes itself in the excavations of madrepores; and as the coral increases around it, the *Magilus* is obliged, in order to have its aperture on a level with the surrounding surface, or near it, to construct a tube, the growth of the coral determining its length. As this tube goes on increasing, the animal abandons the spiral for the tubular part of the shell; and in the operation it leaves behind no

partitions, but secretes a compact calcareous matter, which reaches to the very summit of the spiral part; so that in an old specimen the posterior part of the shell presents a solid mass. One species only, *Magilus antiquus*, is known; the colour is white, more or less pure, owing to the shell being hid from the light by the coral which it inhabits.

This curious shell is found in the coral known by the name of *Meandrina phrygia*, which is a native of the Red Sea. Mr. Sowerby asserts that the tube sometimes reaches the length of three feet; the same writer mentions two species, *M. antiquus*, figured above, and *M. elipticus*.

Siliquaria. *Brug.* (Anguinaria *Schum.*) — *Shell* tubular, irregularly spiral, like *Vermetus*, but the tube has a continued longitudinal slit; operculum horny. *Animal*, with a very small head, the eyes at the base of the small tentacula; the foot is like that of *Vermetus*, cylindrical, lengthened beyond the head, and bearing an operculum, which entirely closes the shell; between the head and the operculum is the rudiment of a foot; the mantle is cloven on the right side. — 7 species; also fossil.



Siliquaria anguina.

This singular shell is often found in sponges in the Mediterranean, and Australian seas. The longitudinal slit is supposed to be for the passage of the branchia of the animal.

Family 25. — *CŒCACEA.*

The eyes of the animals forming this family are placed on the head, between, or rather behind, the base of the tentacula, which are simple; the foot is short. The shell

is almost cylindrical, delicately curved, with suddenly diminishing whorls or spire, which is easily broken off; the operculum circular, horny and spiral. — Marine.

Cœcum. *Flem.* (Brochus *Bronn;* Odontina *Zborzewski;* Odontidium *Phil.;* Cœcalium *Macgil.*)—*Shell* rather cylindrical, more or less curved, tubular, closed at one end, where the younger portions or original spire has been broken off, open at the other, where the aperture is entire; operculum horny, with many whorls. *Animal,* when adult, cylindrical; head muzzle-shaped, flanked by cylindrical subulate tentacula, bearing truncate eyes on (not on bulgings of) their external bases; no lateral cirrhi, nor lobes; foot short, narrow, truncate in front, obtuse behind; no posterior cirrhus; mantle thick, not fringed; a single branchial plume; tongue short, central denticles, apparently undeveloped; two uncini on each side, the inner one broad and serrulated.*— 3 ? species; also fossil.

Cœcum trachea.

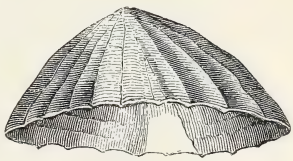
Singular little shells, looking somewhat like *Dentalium,* but they are closed at one end. They are found on the British and Scotch coasts; and the author has received one from Mazatlan, in California.

Family 26. — *SIPHONARIACEA.*

The animals have a two-lobed head, the eyes placed on the lobes; no feelers; a single gill, lying across the neck. The shell is cup-shaped, almost symmetrical, with the apex nearly in the middle. — Marine.

* Forbes's British Moll.

SIPHONARIA. *Sow.* (Liria *Gray;* Trimusculus *Schmidt*). — *Shell* resembling the *Patella* in shape, but with an indented groove in the interior, extending from the apex to the margin, having the appearance of a canal, or siphon, which produces a slight projection at the edge. *Animal* having the head furnished before with two rounded lobes, which bear the eyes at their upper side; no feelers: the mantle lengthened on the right side (where the shell somewhat juts out) into a tongue-formed lobe, which closes with a flap the avenue to the lung cavity. — About 30 species; also fossil.



Siphonaria.

It is difficult, at first sight, to distinguish this shell from a *Patella*, the groove not being very perceptible; indeed, many authors class them together. They are found on the coasts of South America, New Zealand, India, and the Philippines. The animals appear to be ornamented with various colours.

GARDINIA. *Gray.* (Mouretia *Sow.*). — *Shell* conical, muscular impression a connected horse-shoe shape, no projection on the right side where the siphonal groove ends. *Animal* only differing from that of *Siphonaria* by the large head lobes being lengthened and more triangular, as well as that the lobe is wanting in the mantle, which, in that Mollusc, closes the avenue to the lung cavity. — 8 species; also fossil.

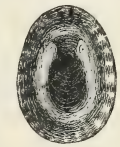
Found in the Mediterranean, Red Sea, and American seas.

Family 27. — *ACMACACEA.*

The animals have a snout-formed head; two long, cy-

lindrical tentacula; the eyes at the outer base, when present; above the neck a cavity having one or two feather-formed gills, which rarely fail to be present. The shell is cup-shaped, entire, and symmetrical. — Marine.

Acmæa. *Eschholtz.* (Lottia *Gray;* Patelloidea *Quoy* and *Gaim.*) — *Shell* like *Patella*, ovate, conical, surface smooth, with radiating striatures, muscular impression dark, horse-shoe-shaped, and interrupted where the head lies. *Animal* with a single pectinated gill, lodged in a cavity, and protruding from the right side of the neck when the creature moves; tongue membrane long; two awl-shaped tentacles, bearing the eyes on the enlarged bases. — 20 species.



Acmæa testudinalis.

Found on the coasts of Norway, Britain, America, &c. *A. testudinalis* and *virginea* are the British species.

Lepeta. *Gray.* (Propilidium, Pilidium, Jothea *Forbes*). — *Shell* cup-shaped, entirely like *Patella*. *Animal*, having no eyes, and two feather-formed gills at the neck; otherwise resembling *Acmæa*. — 1 species.

L. (Patella) *cæca*, is found in the North Atlantic Ocean, and is the only species well known.

Jothea. *Forbes.* — *Shell* like *Patella*. *Animal*, outwardly exactly like that of *Patella* and *Acmæa*, but it has no eyes, and no trace of gills; the tongue is armed like that of *Lepeta*, only the teeth are somewhat differently placed, and particularly the narrow hooks; and the curved part of the same is cilated. — 1 species.

Jothea (Patella) *fulva* from the northern Atlantic ocean.

Order II.

SCUTIBRANCHIATA.

The organs of respiration in the animals ot this order are in the form of a comb, and for the most part double; the tongue is very long, strong, linear, and in a great measure concealed within the intestinal parts, the middle part is many-toothed, and the sides studded with numerous rows of hooks. The shell is either regularly symmetrical, or only slightly rolled up, or cup-shaped.

Family 1.—*NERITACEA.*

The animals of this family have the eyes stalked; no frontal lobes, and no appendages to the sides of the foot. The shell is spiral, globular, conoidal, with no umbilicus; the columella lip flattened; the mouth half-moon shaped; operculum shelly.—Marine and fluviatile.

Nerita. *Lin.*—*Shell* with the spire nearly hidden, or very short; aperture semicircular; inner lip flattened, and frequently toothed; the outer simple, or waved; no umbilicus; operculum shelly. *Animal,* with two slender tentacula, with detached eye-bearing sustentacula at their external bases; foot rather short, triangularly oblong; structure of the tongue complicated; each transverse series of teeth has a minute central denticle, flanked by three laterals, of which the first is largest, transversely expanded, and laminar,

Nerita.

the second and third minute, and bounded by numerous uncini, the first of them very large, broadly hooded, and denticulated, the remainder narrow and linear.* — Above 100 species; also fossil.

The shells of Nerita are often beautifully marked and sculptured; they are brought from the Eastern and American seas, a few species only being European. The *N. peloronta* is called the bleeding tooth, from the red stain about the teeth of the inner lip. Many of the opercula of these shells are very curious; they have a little appendage on one side, which fits into a hollow at the lower end of the inner lip, and against which it turns almost like a door on its hinges, when the animal protrudes itself. Lamarck divided the genus into two — the Neritæ, marine shells, and the Neritinæ, fluviatile; and Mr. Gray remarks that the opercula differ in the following manner: — those of the Nerita are horny, covered on both sides with a hard shelly coat, which may be separated from the horny part; whilst the Neritina has a solid, shelly operculum, furnished with a thin flexible outer edge, and slightly toothed on the straight side.

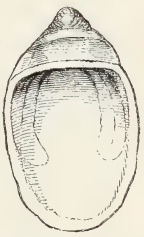
The fluviatile species are found in the East and West Indies, the Isle of France, &c.; they are exceedingly pretty shells, frequently ornamented with spots, bands, or zigzag lines, upon a light ground, and are beautiful when examined with a lens: the Indians wear them as ornaments. The *N. corona* is coated with a black epidermis, and has a row of long black spines on the whorls; the *N. viridis*, a very small green species, is found in the West Indies. *N. fluviatilis* is found in the rivers of England adhering to stones; this shell is often covered with incrustations, and the spire, like many other fresh-water

* Forbes's British Moll.

shells, almost eaten away, in consequence of which the animal thickens that part.

Philippi unites under this the following sub-genera: — Neritina *Lam.*; Clithon *Montf.*; Theodoxus *Montf.*; Corona *Chemn.*; Neripteron *Lisson*; Clypeolum *Recluz*; Mitrula *Menke*; and Velates *Montf.*

Navicella. *Lam.* (Cimber *Montf.*; Septaria *Fer.*; Catillus *Humph.*) — *Shell* oblong, convex above, with the apex not spiral, but bent down to the edge; inner lip thin, and assuming the form of a plate across one end of the aperture; the operculum shelly, of a square form, thin, flat, and furnished with a sharp point proceeding from the side at one corner. (Sow.) Philippi says that the operculum is within the animal, dividing the intestines from the foot, which distinguishes it from Nerita. *Animal* with a broad head, half-moon shaped, eyes on short stalks at the base of the feelers, the foot large and thin edged. — 18 species; also fossil.



Navicella porcellana.

These mollusca are fluviatile, inhabiting the clear rivers of India, the Isle of France, the Polynesian Islands, &c.; they creep on the rocks, and do not continue fixed to one spot, as the *Patella:* the dark zigzag marks on the shell are seen through the epidermis. In the Isle of France they are said to be made into broth for invalids.

Pileolus. *Sow.* (Tomostoma *Desh.*) — *Shell Patella*-like, the apex not quite central, the inner lip is flat and crenulated, and the aperture half-moon shaped; the outer lip marginated. — 2 species, fossil.

Family 2. — *TROCHACEA.*

The animals have the eyes stalked; they are provided with frontal lobes, and they have fringed or thread-like appendages to the sides of the foot. The shell is pearly, spiral, of various forms, mostly operculated; the columella is never flattened, nor straight.—Marine, and plant-eaters.

PHASIANELLA. *Lam.* (Phasianus *Montf.;* Tricolia *Risso;* Eutropia *Humph.*)— *Shell* oval, solid; aperture oval, long, not wide, not pearly; lips disunited at the upper part; right lip sharp, left smooth; the last whorl much larger than the others; operculum shelly. *Animal,* head muzzle-shaped; two long and ciliated tentacula, with eyes on distinct footstalks at their external bases; no intertentacula lobes; neck with a strongly fimbriated lobe on each side; lateral superior expansion of the foot with three cirrhi on each side, the middle pair often very small; foot rounded in front, pointed behind; vent on the right side, and shortly tubular; branchial plume long, single, partially free; tongue closely resembling that of Trochus.*—25 species; also fossil.

Phasianella australis.

Some of the species are most beautifully coloured, smooth and shining, the patterns most elaborate and curious; they were formerly very rare, and are even now much sought after by collectors. They are brought from South America, India, New Holland, and the Mediter-

* Forbes's British Moll.

ranean, &c. The English species, *P. pullus*, is very small and pretty, beautifully streaked and spotted, and very plentiful at Guernsey: the largest and handsomest come from Australia, and are of various shades of purple, crimson, and brown; the animal is as gaily coloured as the shell, and the operculum is mostly white, convex on the outer part, and spiral within.

TURBO. *Lin.* — *Shell* rather turreted, thick, rough, or smooth; base not flattened as in *Trochus;* aperture round, and generally pearly; lips not united; outer lip thin, and sharp; operculum either internally horny, or shelly and solid. *Animal*, head prolonged into a snout, having two pointed tentacula, with the eyes on the outside, on stalks; two frontal lobes between the feelers; on each side of the foot three filaments, frequently also a fringed membrane. — 63 species*; also fossil.

Turbo pica.

The shells of the genus Turbo are many of them very handsome, the greater part of the substance seeming to consist of a pearly substance, which is occasionally of a golden hue; exteriorly they are often spirally ribbed, grooved, or quite smooth. They are principally brought from the seas of warm latitudes.

Philippi mentions as sub-genera: — Sarmaticus, Modelia, Callopoma, Rinella, Collonia *Gray;* Marmarostoma *Sw.*

LIOTIA. *Gray.* — *Shell* flatly compressed, umbilicated; the aperture circular, the edges connected, the outer lip thick, with a regularly expanded border, pearly within; operculum

Liotia Gervillii.

* Reeve's Iconica.

horny within, on the outside shelly. *Animal* like that of *Trochus*, but without frontal lobes between the feelers, instead of which the head has on each side, near the eye, a cone-shaped lobe. — 6 species; also fossil.

Curious little shells from the Cape, India, Australia, &c.

DELPHINULA. *Lam.* (Delphinus *Montf.*; Cyclostoma *Gray*, not *Lam.*) — *Shell* very strong and thick, often but loosely rolled up; spire depressed; umbilicus large; exterior rough, with tubercles; aperture round and pearly; lips united; operculum horny, or shelly (doubtful). *Animal* not differing essentially (according to Quoy and Gaimard) from Turbo and Trochus, but without frontal lobes, or side filaments. — 27 species*; also fossil.

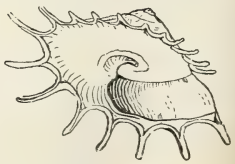
Delphinula laciniata.

All the species forming this genus, of which there are some very beautiful, and others highly curious, are found in the Indian Ocean, on reefs, at low water. Some of them have the whorls entirely separate.

VITRINELLA. *Adams.* — *Shell* conical, very small, glassy, the aperture very large, circular; deeply umbilicated. *Animal* and operculum unknown. — 5 species.

Found at Jamaica: very small and delicate.

CALCAR. *Montf.* — *Shell* like *Trochus*, but having a stellated keel round the angle of the last whorl; conoidal; the aperture oblique, broader than high; exterior generally rough; no umbilicus. *Animal* not to be distinguished from that of *Turbo* or *Trochus;* the operculum shelly,



Calcar.

* Reeve's Iconica.

long, oval, having on the inside a few suddenly increasing whorls, the outside having an indistinct spiral rib.

These shells all have a shelly operculum. Grey has formed out of slight differences in the animal the following genera: — Uvanilla, Pamaulax, Pachypoma, Lithopoma, Imperator, Tubicanthus, and Bolma.

ASTRALIUM. *Philippi.* (Guildfordia *Gray.*) — *Shell* conical, not umbilicated, the outer edge of the whorls lengthened into radiated spines, the outer surface granulated; the lip has near the suture a sinus, and is then strongly curved forwards, which entirely separates this genus from the preceding and following genera; operculum, according to Gray, calcareous, flat, with a slight rim near the outer edge. — 1 species.

The only species is *A.* (Trochus) *triumphans,* from Japan.

GLOBULUS. *Shum.* (Rotella *Lam.;* Helicina *Gray,* not *Lam.*) — *Shell* small, flattish, but convex both at the upper and under part; outside smooth and polished; left lip very much thickened, and spreading over the under surface, so as to form a callosity; right lip sharp at the edge; operculum horny. *Animal* very similar to that of *Turbo,* but the eye stalks strikingly long, and the foot having four filaments on each side. — 10 species; also fossil.

Globulus vestiaria.

Small shells from the Mediterranean, Indian, and Javanese seas. *G. vestiaria* is the most common species. Some found in the West Indies are said to be microscopic.

TROCHUS. *Lin.* — *Shell* rather variable in shape, conical; spire elevated; circumference of the whorls more or less angulated, often quite sharp; lower part of the shell more or less flat; aperture depressed; edge of the

outer lip thin; inner lip curved, rather oblique at the base; sometimes an umbilicus; operculum generally horny, thin, and spiral, of many whorls. *Animal,* head large, terminating in a short proboscis, and bearing two subulate tentacles, sometimes smooth, sometimes ciliated, and two strong, separate eye peduncles at their outer bases; between the tentacles are two more or less developed head lobes (nearly obsolete in some species); next the eye peduncles, on each side is a large lappet, continuous with greatly developed side lobes, bearing usually three, sometimes four or five, subulate cirrhi; foot more or less lanceolate, or oblong, an operculigerous lobe on its upper surface, bearing a many-spiral horny operculum; gill very long, linear; tongue rather long, each series of denticles composed of a central element flanked by fine hooked lateral, and numerous narrow, accessorial teeth.* — Almost 200 species; also fossil.

Trochus obeliscus.

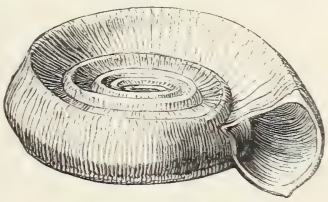
There are many handsome shells belonging to this genus, and they are found in various parts of the world; the British species (about sixteen) occur on various parts of our coasts; some are pretty, but they do not attain the size or beauty of the foreign kinds. Their peculiar conical shape, and flattened base, together with the iridescent aperture, and beautiful pearly appearance, render them easy to be distinguished.

Philippi enumerates the following as sub-genera: — Pyramis *Schum.;* Polydonta *Schum.;* Clanculus *Montf.;* Craspedotus *Phil.;* Labio *Oken;* Euchelus *Ph.;* Diloma *Phil.;* Chlorostoma *Sw.;* Oxystele *Phil.;* Osilinus *Phil.;*

* Forbes's British Moll.

Trochus *Risso;* Phorcus *Risso;* Cittarium *Phil.;* Omphalius *Phil.;* Margarita *Leach.*

Euomphalus. *Sow.* — *Shell* orbicular, a planorbular spire, with three or four volutions, imbricated above, smooth below; aperture of a round polygonal form; umbilicus large, penetrating to the apex of the shell.* — 80 species; fossil.



Euomphalus pentangulatus.

Sowerby observes that these fossils are very like Delphinula, the main difference being that their whorls do not increase so rapidly in size. Dr. Mantell has discovered that the inner whorls are divided by partitions, as if the animal had retreated with its growth from the apex of the spire; but these partitions are not perforated like the chambers of the Nautilus. This part in the fossil is usually filled with spar.†

Philippi has the following as sub-genera: — Serpularia *Römer;* Maclurites *Lesueur;* Ecculiomphalus *Portlock;* Schizostoma *Bronn.;* Centrifugus *Hisinger.*

Rhaphistoma. *Hall.* — *Shell* compressed, conical, with three or four whorls, which are not separated from one another; the umbilicus is moderately deep; the aperture almost triangular; the upper part of the whorls is marked with a kind of keel, which arises from the lines of growth turning in a different direction, which makes the outer lip have a somewhat shallow groove. — 3 species; fossil.

Scalites. *Conrad.* — *Shell* seeming only to differ from that of the last genus in the more elevated spire.

* Sowerby's Genera of Shells. † The Medals of Creation.

(From a description by Hall in the Palæontology of New York.)—Fossil.

CYRTOLITES. *Conrad.*—*Shell* disk-like, the whorls on both sides equally compressed or flat; the whorls increasing quickly, and sometimes separated from each other; they are sharply keeled at the back, the sides indistinctly so; the aperture is but little expanded, and square in form.—4 species, fossil.

BANKIVIA. *Beck.*—*Shell* turreted, smooth, polished, without epidermis, the whorls almost level; the aperture nearly square; the columella sometimes twisted, at the lower part truncated, the outer lip thin. *Animal* and operculum unknown.—1 species.

Bankivia varians.

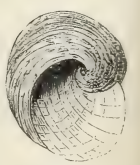
Pretty shells from New Holland, but the animal not being known, their systematic situation is uncertain.

STOMATIA. *Helblin.* (Stomax *Montf.*)—*Shell* somewhat ear-shaped, the outside generally striated or carinated, with a raised rib; the inside very pearly; the whorls project from the axis; no operculum. *Animal,* foot very large, prolonged behind, the fringe membrane on the left side under the eye stalk, ending in a tuft, on the right side prolonged into a fold.—12 species; also fossil.

Stomatia phymotis.

Brought from the East Indies and New Holland.

STOMATELLA. *Lam.*—*Shell* ear-shaped, regular; aperture large, oblong, and very pearly; some species have an operculum, which is thin, horny, and with irregular layers of growth. *Animal* not differing much



Stomatella.

from that of *Trochus*, but there are no filaments at the sides. — 10 species.

Brought from Java, India, New Holland, &c; the shell differing from Stomatia principally by the raised rib at the back.

BRODERIPIA. *Gray.* (Scutella *Brod.*) — *Shell* minute, somewhat like a *Patella;* the apex inclined near the posterior margin; aperture oval, very large, and very pearly, two long oval muscular impressions at the side. *Animal* and operculum unknown. — 3 species.

Broderipia rosea.

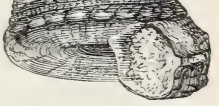
Found in the South Seas; at the Philippines, &c.

ANATOMUS. *Montf.* (Sissurella *D'Orb.*) — *Shell* small and delicate; spire small; last whorl large, the surface striated; aperture rather round, and having a narrow slit near the middle of the outer lip. *Animal* (according to a written description of Sars) very like that of *Trochus.* — 8 species; also fossil.

Anatomus crispata.

Small shells, some quite microscopic, found in the Mediterranean, also in the seas of Norway and Britain, where they have been found off the Zetland islands.

PLEUROTOMARIA. *Defrance.* — *Shell* turbinated, spiral; aperture nearly square, with rounded angles; outer lip with a deep slit or notch near the middle, from which a band is continued round the whorls, formed by the slit being continually filled up; no canal as in *Pleurotoma.* — 400 species, all fossil.



Pleurotomaria anglica.

These shells are only known in the fossil state; they resemble Trochus in form, but are distinguished by the slit in the outer lip.

Trochotoma. *Deslongchamp.* (Ditremaria *D'Orb.*) — *Shell* with a slit on the outer lip, approaching the edge, but not reaching it; the base has an umbilicus, and the aperture is half-moon-shaped; the outer lip is a little thickened; the whorls are usually angular, and concentrically striped. — Fossil.

Trochotoma conuloides

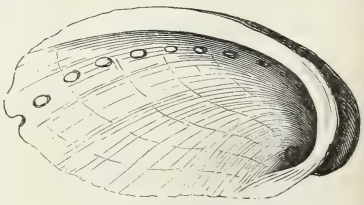
Very like *Trochus* in form, but the slit near the lip distinguishes it. Only known in the fossil state.

Cirrus. *Sow.* — *Shell* spiral, conical, with a hollow axis; whorls contiguous, numerous, rounded, or slightly angulated.* — Fossil.

Cirrus.

Sowerby observes that this fossil is distinguished from *Trochus* by the deep funnel-shaped umbilicus: several species are represented in that author's work called Mineral Conchology. The name signifies a curl, the form bearing some resemblance to one; they are common in the white chalk. Philippi remarks that the mouth is entire, but that there are at a short distance from the margin, tube-like apertures as in *Haliotis*.

Haliotis. *Lin.* — *Shell* flat, ear-shaped, very pearly inside; aperture very large, comprising very nearly the whole of the shell; outside rough, slightly spiral at one end, and having one



Haliotis tuberculata.

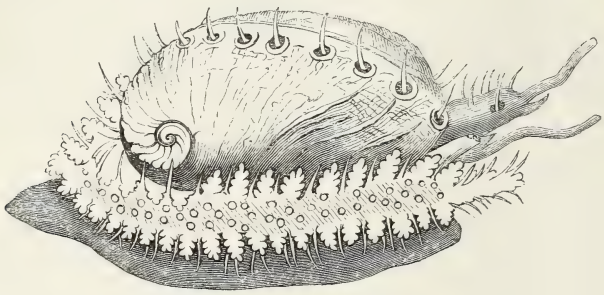
* Sowerby's Genera of Shells.

side perforated with small holes. *Animal*, shaped like the shell, its head terminating in a short muzzle, and bearing two subulate tentacles and two stout eye peduncles at their external bases; a fimbriated lobe between the tentacula, apparently continuous with the fimbriated and cirrhated lateral lobes of the body; lateral cirrhi numerous; foot very large, oblong, rounded at the extremities, bearing on its upper extremity a rudimentary operculigerous lobe, but no operculum; branchial plumes two; dental system consisting of a median tooth flanked by two laterals, four primary accessorials and numerous secondaries.*—73 species†; also fossil.

The form of this shell somewhat resembles that of the human ear, and it is from that circumstance frequently called the Ear-shell; one species, from its length, having received the name of the Ass's Ear. The outside is generally rough, worn or covered with marine substances; the inside presents the same enamelled appearance as mother-of-pearl, and exhibits the most beautiful colours. The holes with which the shell is perforated are for the passage of the lobes of the animal's mantle, and are made at regular intervals, as it increases in size. It is observable, however, that as each new one is formed the one nearest the spire is closed up; so that there are generally the same number open at a time, and seldom more than seven or eight. The annexed cut is a representation of one of the species of this curious genus, with its living inhabitant, which, notwithstanding its apparent size, can be covered by the shell. In its state of rest, it is able to adhere with such tenacity to the substance it is fixed upon as to be removed with very great difficulty, although it can detach itself with ease. It is always found near the surface of

* Forbes's British Moll. † Reeve's Iconica.

the water, and on serene nights feeds on the vegetation which springs up on the shore.



Haliotis tuberculata.

The *Haliotis* is found in New Holland, China, the Cape of Good Hope, the Moluccas, &c.; one of the most common species, and yet a very beautiful shell, is the *Haliotis tuberculata*, represented in the figures, which is found in great abundance on the coasts of Guernsey and Jersey, where the animal is used for food; and the shells are frequently arranged in patterns on the outside of the cottages, being cemented into the mortar, with the inside exposed: these have a very beautiful appearance when the sun shines upon them. They are occasionally found upon our coasts; but as it is only after violent storms, they are supposed to have been brought from the shores of the Channel islands.

In the islands of the South Seas these beautiful shells are used by the natives to ornament their boats, and to make a kind of musical instrument; they also form the thick left lip of the aperture into fish-hooks. The natives of New Zealand use the shells as spoons. Pearls are sometimes found in them.

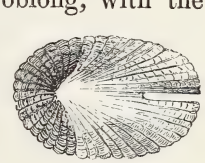
Mr. Forbes thus describes the colours of the living

inhabitant of these beautiful shells: — "The animal is variously tinted, with tints of brown, green, white, and salmon colour. The head and tentacula are brown, the eye peduncles white, the eyes blue. The lateral cirrhi, which thickly fringe the side lobes, are greenish brown; the side lobes themselves striped alternately with brown and greenish white. The sides of the foot are dark greenish brown; its disk, which is rounded at each extremity, of a salmon colour."

Family 3. — *FISSURELLACEA.*

The animals of this family are symmetrical; the eyes sessile. The shell is also symmetrical, always cup-shaped, never operculated, and rarely absent. — Marine.

EMARGINULA. *Lam.* — *Shell* rather oblong, with the apex entire and curved, and having a narrow slit or notch in the margin in front; interior smooth; exterior with raised lines in rays. *Animal* with a short muzzle, terminating a tumid head bearing two subulate tentacles with sub-pedunculated eyes at their external bases; a range of cirrhi around the sides at the base of the foot; mantle simple edged; anal siphon with its angulated membranous sides projecting from the edges of the fissure; branchial plumes two; tongue with numerous transverse dental elements; its rachis composed of nine teeth, the central one laminar, and subquadrate, the lateral teeth very numerous.* — 26 species; also fossil.

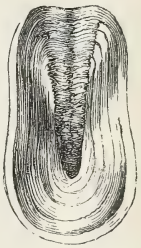


Emarginula reticulata.

* Forbes's British Moll.

Small shells, easily recognised by the slit at the margin, found in the European seas, also at Amboyna, the Isle of France, New Holland, &c. There are three British species.

Scutum. *Montf.* (Parmophorus *Blain.*)—*Shell* oblong, depressed slightly, convex on the outside; the apex small, and somewhat inclining to one end; the front side slightly hollowed out; the back rounded. *Animal*, with the foot thick, which below the mantle is surrounded by a row of papillæ; the mantle is larger than the animal, and forms a double fold at the edge, the under portion turns down towards the foot, the other over the shell; the head is large, ending in a snout; the tentacula long, bearing the eyes externally at the base. —5 species; also fossil.



Scutum australis.

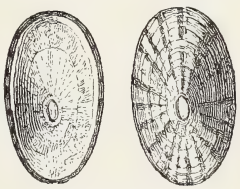
The shells of this genus are found in New Holland and New Zealand under stones, the animals living upon zoophytes and weeds: Mr. Cuming says they walk freely, and are of a black hue.

Rimula. *Defrance.* (Diodora *Gray;* Puncturella *Lowe;* Cemoria *Leach.*)—*Shell* thin and cross-barred; a hole lies between the apex and margin, not reaching the latter, but in the line of an elevated rib; in the interior a groove corresponds to the hole and the elevated rib, and this is partly covered with a shelly plate. *Animal*, with a short muzzle-shaped head, bearing two subulate awl-shaped tentacles, which have the eyes placed on prominent bulgings, or rudimentary pedicles at their external bases; a range of cirrhi interrupted behind on each side; mantle simple-edged; anal siphon very prominent, forming a truncated membranous canal projecting from the subapical

perforation; branchial plumes two.* — A few species; also fossil.

The Philippine seas, and Northern Atlantic Ocean, produce these small shells. *R. noachina* is the one most commonly known.

Fissurella. *Brug.* (Macroschisma *Sw.;* Pupillia *Gray;* Fissurellidea *D'Orb.*) — *Shell* oval, conical, the apex on the shorter or anterior side of the shell having a round or oval hole; surface exteriorly generally radiated, or rough. *Animal,* with a short muzzle, terminating a tumid head, bearing two subulate tentacles, at the external bases of which are the eyes, placed on rudimentary pedicles; a range of numerous cirrhi round the sides at the base of the very large foot; mantle produced in front, with a fringe of cirrhi above its margin; anal siphon, in the form of a short, truncated membranous canal, projecting from the apical aperture of the shell; branchial plumes two.† — 122 species‡; also fossil.



Fissurella limbata.

The hole at the apex of this shell, serving as a passage for the water from the branchiæ of the Mollusc, which are situated near it, differs in form, varying also with the age of the shell, being in some species round, whilst in others it is oblong, or resembling a key-hole. The shells are generally thick and strong, and often delicately marked with alternate dark and light colours. A few species are found on the coast of England, in the same situations as the *Patella;* but none are so beautiful as those which are found in the Tropics, some of which are very elegantly

* Forbes's British Moll. † Ib. ‡ Reeve's Iconica.

painted with various colours in rays from the apex to the margin. Forbes says that the very young shells do not have the *apex* perforated, the opening being lower down.

Deridobranchus. *Ehrenberg.*—*Animal* like a shell-less *Emarginula;* the mantle forms over the front a fold, covering the two symmetrical comb-shaped gills, and there are a pair of tentacula bearing the eyes at the base.—1 species.

D. argus is found in the Red Sea.

Order III.

CYCLOBRANCHIATA.

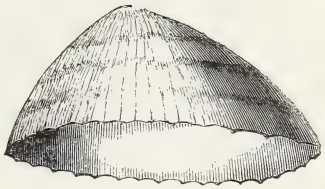
The animals of this order are symmetrical, and have the organs of respiration placed in a circle round the body, in the form of little leaves. The families Patellacea and Chitonacea, which belong to this order, agree apparently in the internal organisation, however they may differ externally; their enormously long tongue is similarly armed, the middle line has several rows of teeth, and the sides several rows of hooks; the Patellacea have tentacula and eyes, and the heart is placed in front, whilst the Chitonacea have no tentacula nor eyes, and the heart lies behind.

Family 1.—*PATELLACEA.*

Animal with tentacula and eyes; the heart placed in front. The shell is mostly of a shallow cone-shape.—Marine.

Patella. *Lin.* (Lepas *Adan.;* Goniclis *Rafin.*)—*Shell* simply conical, not spiral; without any perforation,

or internal appendage, and with the margin undivided, though sometimes marked or waved by the external ribs, or striæ; apex inclined towards the front part of the shell, where the head of the animal is situated, the mark of which can generally be traced in the interior by the muscular impression being there interrupted. *Animal*, head very distinct and supporting two tentacula, having eyes at the outer and lower extremity; branchiæ placed between the mantle and the foot, and nearly reaching round the body; foot a large disk; head with cartilaginous jaws, and a very long tongue, armed with transverse rows of teeth. — About 100 species; also fossil.



Patella vulgata.

The genus *Patella* is to be found in all parts of the world, chiefly on rocky coasts, and often where the sea breaks with considerable violence; many species, (from the shape of the shell corresponding exactly with that of the rock on which they have lived,) appear never to move from the spot they have once selected, and even form in most cases cavities in the rock itself, by a power they possess of absorbing its substance: the *Patella vulgata* of the British coast has this property.

The *Patella cochlea* is found at the Cape of Good Hope; it lives almost exclusively attached to a larger species of the same genus, on the surface of which it forms a flat disk exactly the size of its mouth. To form these flat disks (of which there are so generally two, one on each side of the apex of the larger *Patella*, as almost to form a character of the species), and to assist in the increase of its size, the animal appears to absorb the coralline, or other

similar substances, with which the larger shells are abundantly covered.*

There are other species, on the contrary, which do not remain entirely attached to the same place, but occasionally move; and others, again, which fix themselves to seaweeds, which appear to be the food of the whole genus. They are particularly abundant at the Island of Cyprus and the Cape of Good Hope; where they are often found of a very large size, and are used as spoons by the Hottentots. The common English species is rather smooth on the outside; but many of the foreign ones are covered with ridges in rays from the apex to the circumference. Sometimes these ridges extend beyond the edge of the margin, and appear like the rays of a star. Some species were used for the table in former times, and the common species of the British coasts is still gathered by the poorer people for the same purpose.

Philippi mentions Nacella *Schum.;* Helcion *Montf.;* and Scutellina of *Gray,* as sub-genera.

Carinaropsis. *Hall.* — *Shell* symmetrical, almost conical, patella-formed, somewhat angular, or keeled at the back; the aperture oval, contracted behind. — Fossil.

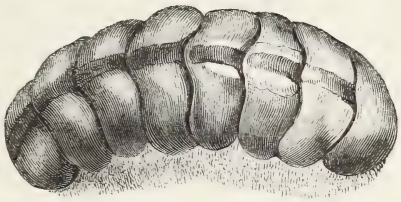
Family 2. — *CHITONACEA.*

The animals have no tentacula, and no eyes, and the heart is placed behind. The shell is formed of eight small pieces, lying one over the other in a row, united by a tough ligament.—Marine.

Chiton. *Lin.* — *Shell* oblong, composed of about eight pieces, which fold over each other at their edges, and are

* Gray, Philosophical Transactions, 1833.

inserted into a tough ligament, which is either wrinkled, granulated, or spiny, forming altogether a boat-shaped shell. *Animal*, having the head rather indistinct; no tentacula nor eyes, but having a membranous veil, and a long tongue spirally rolled, and armed with horny teeth; branchiæ forming a series of lamellæ between the mantle and the foot on each side; foot long and disk-shaped, rounded at each end. — 194 species*; also fossil.



Chiton piceus.

The ligament of this shell is either fleshy, smooth, wrinkled, or covered with scales or tufts of hair; and in the *Chiton spinosus* and other species, it is armed with numerous thin long black spines. The interior of the shell is generally white; but some are green, and one species is of a beautiful rose colour. They often attain a large size, measuring several inches in length; but do not usually exceed two inches. They are found in most seas, at low water, on the rocks and stones, but they are removed with difficulty, for they adhere with extraordinary tenacity; the larger species come from warm latitudes, and several, of a small size, are found on the British coast. They have the power of rolling themselves up into a ball, like the woodlouse or the hedgehog.

The animals of Lamarck's genus Chitonellus (considered by Philippi as not separated from the above genus) can move with great rapidity, turning their bodies to the right and left as they walk on the stalks of marine plants. "They seem to feed entirely by night. Though they

* Reeve's Iconica.

remain stationary by day, yet when disturbed they will creep away with a slow and equal pace; sometimes sliding sideways and creeping under rocks and stones for concealment. If accidentally removed, they soon recover their position by violently contorting and undulating; and for defence they sometimes roll themselves up like woodlice."*

NOTOTREMA. *Rafinesque.*— *Shell* consisting of three separate pieces; the first or middle one is large, oval, conical, bored through at the point; the second is small, lateral, placed beneath, serving for support; the third is operculum-like, closing up the point of the first. *Animal* adhering firmly in the manner of a *Patella;* the head lengthened, and truncated; the eyes sessile. — A very doubtful genus.

ORDER IV.

CIRRIBRANCHIATA.

THE animals have the organs of breathing hair-like, and situated in two lobes above the neck; the foot is formed like a proboscis, pointed and conical; shell tubular, symmetrical, slightly curved, and open at both ends.—Marine.

Dentalium elephantinum.

DENTALIUM. *Lin.*— *Shell* tubular, regular, smooth or fluted, sometimes with a cleft; more or less curved in form, gradually tapering to the posterior end; both extremities open. *Animal* long, slender, attached to the shell near its hinder extremity, having a rudimentary

* Swainson's Malacology.

head, but neither eyes nor tentacula; foot a pointed cone; stomach with a gizzard; tongue broad, oval, with a row of axile quadrate teeth; on each side a simple row of hooks having folds at the edge. — 30 species; also fossil.

These shells resemble in form an elephant's tusk; some species are ribbed, or fluted longitudinally, others transversely, but many are smooth. They are found in the Indian and European seas; of the latter there are two species — *D. entalis*, found on the northern shores of England, and *D. Tarentum*, on the southern. The animal is said to feed on small bivalves and Foraminifera.

Cadulus. *Phil.* — *Shell* distinguished from *Dentalium* by its being short, completely oval, with the aperture almost circular, of which the back part is somewhat smaller, and the edge is notched. — 1 species, fossil.

Philippi formed this genus for a fossil, *D. ovulum*.

Order V.

TECTIBRANCHIATA.

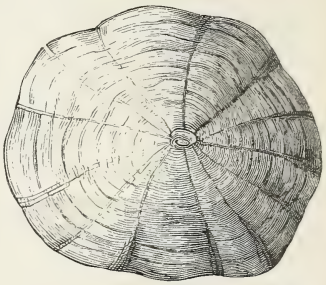
The animals have the organs of breathing unsymmetrical; more or less covered by the mantle. The shell sometimes completely encloses the animal, at others it is rudimentary and internal; seldom absent.

Family 1. — *PLEUROBRANCHEA.*

The gills of these animals are situated under the edge of the mantle. — Marine.

Umbrella. *Lam.* — (Umbraculum *Schum.*; Gastroplax *Blain.*; Acardo *Megerle.*) — *Shell* rather irregular,

but nearly round, and smooth, slightly convex on the outside, and with a small nearly central apex; margin sharp. *Animal*, with an oval, thick foot, in front two-lobed; the mantle small, thin, almost flat, in the centre of which is a small, oblique oval, or nearly circular shell; the gills lie on the right side, prolonged almost to the left side, and consist of numerous feather-shaped laminæ; over the furcation of the foot are two longish tentacula, which have the eyes on the inner side. — 2 species; also fossil.



Umbrella Indica.

The *Umbrella Indica* is met with in the Indian Ocean, and on the coasts of the Isle of France, and is commonly called the "Chinese Parasol;" it is thin, transparent, and the interior is marked with rays proceeding from the centre, besides which there is a yellowish stain. The *U. Mediterranea* is found living in the Gulf of Tarento, and also in the fossil state in Sicily. It is a smaller shell than the preceding, and destitute of the rays.

TYLODINA. *Rafinesque.* — *Shell* cone-shaped, either flat or elevated, and the summit having two embryo whorls. The *animal* can withdraw entirely into the shell; the head (or chin) is lengthened and bordered; both sides prolonged into a flat point or tentacle; two large pipe-shaped tentacula, cloven outwardly, are placed on the neck, on the inner base of which are distinct eyes; the gills are situated on the right side in the form of an oval, double-feathered leaf; behind lie the anal openings, appearing

somewhat tubular; the foot is strong, thick, with an oval sole. — 4 species.

From the Mediterranean and the coast of Norway.

PLEUROBRANCHUS. *Cuvier.* (Lamellaria *Montf.*) — *Shell* thin, nearly flat and obliquely oval; apex near the edge; internal, or covered by the *animal*, which is oblong, or suborbicular, fleshy; head with two grooved tentacula, the eyes at their external bases; a broad tentaculiform buccal veil; mouth provided with corneous jaws, and an armed lingual ribbon; branchial plume single, free towards its extremity, placed on the right side between the mantle and foot; the latter is ample, separated from the mantle by a deep groove.* — Many species.

Pleurobranchus.

Found in the Indian seas and the Mediterranean: the animal often exhibits gay colours.

PLEUROBRANCHÆA. *Meckel.* (Pleurobranchidium *Blain.*; Cyanogaster *Rudolphii.*) — No trace of a *shell.* *Animal*, having the edge only of the mantle placed a little forward, and extending in front into four tentacula, which are but short, the hinder ones are also ear-shaped; the gill projects a little, and is not deeply divided, as in *Pleurobranchus*, and the anal opening lies not behind, but over it. — 2 species.

P. Meckelii is found in the Mediterranean; and *P. maculata* is also mentioned by Quoy and Gaimard.

POSTEROBRANCHÆA. *D'Orb.* — *Shell* none. *Animal*, having the mantle broad, oval, like that of *Pleurobranchea*, the front is separated from the head by a shallow notch; the tentacula are entirely absent; the anal opening, and

* Forbes's British Moll.

the gills lie on the left side, far towards the back; the foot is divided behind by an oblique notch, and ends in lobes which cover the gills. — 1 species.

Posterobranchæa maculata was found by D'Orbigny on the coast of Chili.

Family 2. — *APLYSIACEA.*

The gills are situated on the back of the animal, and are either covered by a shield, or a rudimental shell; the tentacula are distinct. — Marine.

APLYSIA. *Lin.* — *Shell,* or operculum for the gills, an oval, generally thin, nearly transparent plate, with only rudimentary indications of a spire. *Animal* ovate, convex; its head pedicled, furnished with four auriculated tentacula; at the anterior and lateral bases of the upper two are the small sessile eyes; shell imbedded in an opercular lobe, placed centrally in the back, and protecting the branchial plume, which is not protruded; mantle with large lateral lobes folding over each other, and protecting the operculum, but capable of being used for swimming; foot oblong; mouth subproboscidiform, armed with corneous jaws; tongue armed with a single row of hamated central teeth, and numerous uncinated laterals; gizzard studded with cartilaginous plates.* — Many species.

Aplysia.

These animals resemble large slugs; they swim easily, but crawl slowly: they are found in the Mediterranean Sea. Darwin, in his Journal†, says it feeds on delicate

* Forbes's British Moll.

† Journal of Researches into the Geology and Natural History of the Countries visited by the Beagle.

sea-weeds which grow among the stones in muddy and shallow water; and that he found in the stomach of several, small pebbles as in the gizzards of birds. He also mentions that, when irritated, they emit a fine purplish-red fluid, which stains the water for the space of a foot round, and that, besides this means of defence, an acrid secretion, which is spread over the body, causes a sharp stinging sensation; he found them at St. Jago. Forbes says that they are perfectly harmless, though they have been regarded with fear as poisonous and hurtful; but there does not seem to be any foundation for this idea. *A. hybrida* is found on the English coasts. The eggs are said to be attached together in long lines like ribbons. The animal is sometimes called the "Sea Hare."

Philippi has the following as sub-genera: — Dolabella *Lam.;* Thallopus *Sw.;* Aclesia *Rang;* Aclesia *Gray;* and Bursatella *Blain.*

Icarus. *Forbes.* — The animal differs from Aplysia, as it possesses only two tentacula; the body is prolonged into a long tail behind, and the shell is like that of a Bullæa, even having a spiral apex. — 1 species.

I. Gravesii is found in the Egean Sea.

Notarchus. *Cuvier.* (Busiris *Risso.*) — The animal differs from *Aplysia* in having the lobes of the mantle so much united to each other that only a long cleft remains, through which the water enters to the gills; there is no shell to cover the gills, and the sole of the foot is very narrow. — Few species.

Found in the Mediterranean.

Lophocercus. *Krohn.* — The animal has the head truncated, and bears on the angle two ear-shaped tentacula; lip appendages absent; the mantle, cloven in the

middle of the back, allows a Bulla-shaped shell to appear; the tail is much lengthened and compressed. — 1 species.

L. Sieboldii is the only known species.

LOBIGER. *Krohn.* — Separated from *Lophocercus*, by the body having four processes on each side resembling butterflies' wings; the shell has only a slight trace of volutions. — 1 species.

L. Philippii is the only species.

These animals and shells form a connection with the following family.

Family 3. — *BULLACEA.*

The gills of the animal are situated on the back, and are covered by the mantle; sometimes there are no feelers; some have no shell, others have an internal one, and others again have an external shell sufficiently large to contain the whole body. — Marine.

APLUSTRUM. *Schum.* (Hydatina *Schum.*; Bullina *Fer.*) — *Shell* oval, globular, thin, with a few quickly increasing whorls, which are visible at the apex; the aperture wide, entire beneath, or lengthened into a short canal. *Animal*, having a head with four large ear-shaped tentacula; behind the hinder pair there are two eyes, from behind these proceed two broad lancet-shaped lobes, which turn back over the shell; the foot is far broader and longer than the shell, truncated in front, and running out on each side into a sickle-shaped point; the tongue in the *A. physis* has not a middle row of teeth, but on each side there are thirteen rows of strong hooks, with four notches on the inner side. — Few species.

Aplustrum.

This genus embraces the species (Bulla) *aplustre, physis,* and *velum;* the latter is a very delicate shell, of a very light horn colour, with a snow-white band about the middle, bordered on each side by one of a dark brown colour; the apex and base are white, both bordered by dark brown bands.

CYLICHNA. *Lovén.* (Bullina *Risso.*)— *Shell* cylindrical; spire either very small or none, and the apex umbilicated; columella thickened, with or without a plait; shell either strong, smooth, striated, or grooved; no operculum. *Animal* not investing the shell; its head depressed, subquadrate, truncate in front, produced posteriorly into two, more or less separated, broad tentacula, in front of whose bases are the more or less distinct eyes; lateral lobes reflected more or less distinctly on the shell; mantle with a posterior process or lobe; foot oblong, shorter than the shell; tongue with a single row of subquadrate axile teeth, with inflexed serrulated apices: these are flanked on each side by several uncinated laterals, the innermost ones much larger than the others; no gizzard.* — Several species; also fossil.

There are seven British species, the pretty *C. cylindracea* of Pennant being one of them. *Bulla truncata* Ad.; *umbilicata* Mont.; and *acuminata* Brug.; belong to this genus.

AMPHISPHYRA. *Lovén.* (Utriculus *Brown.*) — *Shell* thin, inflated, ovate or sub-globose; whorls of the spire exposed, depressed, with a mamillated nucleus; aperture expanded, not extending above the body whorl, outer lip sinuous, produced, inferiorly retiring at its junction above; pillar lip sub-umbilicated; no operculum. *Animal,* capable

* Forbes' British Moll.

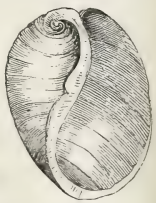
of being entirely retracted into the shell; its head broad and short, flanked by two distant triangular tentacula, and bearing two immersed eyes some way above their bases; tongue broad, armed, axile denticle, broadly quadrate, with its upper edge inflected and serrulate; flanked on each side by a single hamate lateral with a broad base; no gizzard; foot broad, truncate, and sub-bilobed in front, shorter than the shell, and unequally bilobed behind.* — Several species.

Forbes mentions one British species, *A. hyalina*, which is also found on the coast of Norway. Philippi includes *A. globosa* of Lovén, and *Utriculus pellucidus* of Brown.

Bullinula. *Beck.* — *Shell* oval, obliquely striped, with convex whorls; aperture large; spire slightly produced and conical. *Animal*, with a circular head, on each side lengthened into a blunt horizontal projecting tentacula, and two rather long oval lobes projecting from them, which are thrown backwards over the shell; the foot is very large, longer and broader than the shell. — 3 species.†

Philippi mentions *Bulla undata* Brug., and *B. scabra* Chem. (not Müll.), as belonging to this genus.

Bulla. *Lin.* — *Shell* rolled up, long, egg-shaped; apex truncated, and umbilicated; aperture extending the whole length of the shell, and sometimes very open. *Animal*, bulky, partially investing but not covering the shell; capital lobe large, truncated in front, bilobed posteally, furnished with immersed eyes (except in *B. cranchii*) towards the centre of the disk; lateral lobes very large,



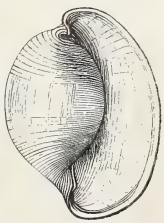
Bulla.

* Forbes's British Moll. † Sowerby's Thes. Conch.

reflected on the shell; a more or less developed caudal lobe reflected on the spire; foot large, quadrate, extending beyond the shell posteriorly; gizzard armed with calcareous plates; tongue without axile plate, but armed with numerous laterals; branchial plume single.* — Several species; also fossil.

The animal of the *Bulla* can nearly, but not entirely, enter into its shell; it swims well by means of the lateral lobes, and is found in the seas of Europe, India, &c. They possess a very singular testaceous apparatus within the body, which acts as the gizzard of a bird, crushing the food, which consists of smaller mollusca with their shells. Sowerby says that they are very voracious, and are sometimes distorted by having swallowed entire shells, which are thick, strong, and nearly equal in size to themselves. This apparatus is composed of three bony pieces united by a muscular membrane; the two side pieces are triangular, the other is smaller; it is sometimes seen shining through the shell. *B. ampulla, striata,* and some others, belong to this genus.

Atys. *Montf.* (Naucum *Schum.;* Haminea *Gray.*) — *Shell* Bulla-shaped, with the last whorl covering the rest, and hiding the spire, rounded at both ends. *Animal,* with only a faint intimation of either tentacula or hinder lobes proceeding from the head lobe; the eyes above, like those of *Bulla;* the foot very large, at the sides parted into two lobes, which are thrown back over the shell, and entirely cover it; a gizzard. — 22 species†; also fossil.



Atys.

* Forbes's British Moll. † Sowerby's Thes. Conch.

Philippi observes that this genus is founded on *Bulla hydatis* and its allied species.

GLAUCONELLA. *Gray.* (Thecaphorus *Nutall.*)—*Shell* very irregular, oval, scarcely rolled even at the spire. *Animal,* with a quadrate head-shield, which bears above it the two eyes; no tentacula, and no processes directed behind; the foot tolerably large; the mantle extended on each side into two large wings, which can be thrown back over the shell.—Few species.

This genus is formed on *Bulla viridis* of Quoy and Gaimard, *B. glauca,* and some others.

CRYPTOPHTHALMUS. *Ehrenburg.*—*Shell* fragile, horny, very slightly rolled in; no columella nor spire; aperture wide. *Animal,* with the head-shield small, deeply bordered behind, without any indication of tentacula, and bearing the eyes sideways; the foot very large, both sides (like *Atys*) extended into wings, which are thrown back over the shell. — 1 species.

C. smaragdinus of Ehrenburg.

XANTHONELLA. *Gray.* — *Shell* small, more resembling an *Aplysia* than a *Bulla,* longish, oval, the outer part convex, the inner concave, lengthened behind into a beak, furnished at the right side with a slight roll inwards, which supplies the place of a spire. *Animal,* with a small, almost quadrate head bordered behind, and bearing the eyes; the foot rather long, far larger than the shell; the mantle drawn out on each side into a wing-shaped lobe, which may be drawn over the back.

Bulla lutea of Quoy and Gaimard forms this genus.

ALICULA. *Ehrenburg.* — *Shell* not appearing to differ essentially from *Bulla. Animal,* cylindrical, head-shield rhombic, bearing the eyes sideways; the foot three-

lobed, the two side lobes cover the front part of the shell, and the hinder lobe is thrown over the back part.

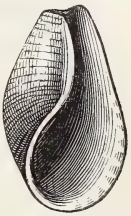
The *A. cylindrica* of Ehren. is found in the Indian and Red Seas.

ACERA. *Müller.* (Vitrella *Sw.*) — *Shell* oval, very thin, flexible, truncated, and keeled, all the whorls visible, and the channel provided with a deep notch parallel to the suture. *Animal,* with the tongue having in the middle a row of rather quadrate teeth, and on each side about twenty-one long sharp hooks.

Acera concinna.

Bulla akera of Müll. and *B. ceylanica* of Brug. belong to this genus. The animals lay their eggs in a single row or string.

SCAPHANDER. *Montf.* (Assula *Schum.*) — *Shell* ovate, pyriform, convolute, narrowed above, expanded below; spire depressed; aperture contracted above, patulous below, not canaliculated; no operculum. *Animal,* not investing the shell, bulky; capital disk large, quadrate; lateral lobes small; foot ample, but short; eyes none; gizzard of thin calcareous plates; axis of tongue unarmed, its lateral membrane armed each with a single series of uncinated teeth.* — 3 species; also fossil.



Scaphander lignarius.

Scaphander (Bulla) *lignarius* is the British species; a mollusk remarkable for the size of its gizzard, which is formed of large calcareous plates, having great power to grind down the food. Forbes mentions that this curious apparatus was formerly made into a *genus,* so little was its real source known.

* Forbes's British Moll.

PHILINE. *Ascanias.* (Lobaria *Müll.;* Bullæa *Lam.*) — *Shell* concealed in the mantle of the animal, thin, fragile, almost transparent, only slightly involute, destitute of distinct spire, or columella; aperture very large and wide. *Animal,* investing the shell, large, shiny; capital disk oblong, or subquadrate; no eyes nor tentacula; lateral lobes developed; foot not produced posteriorly; branchial plume single; gizzard armed with testaceous plates; tongue without axile teeth; laterals in a single or double file.* — Several species; also fossil.

Philine.

There are six British species, of which *P. aperta* is the most common: it is found on all our coasts. *P. hirundinina* is found on the coasts of the Isle of France, the animal of which is of a beautiful blue colour.

DORIDIUM. *Meckel.* (Bullidium *Meckel;* Acera *Cuv.*; Lobaria *Blain.;* Eidothea *Risso.*)— No trace existing of a *shell. Animal,* looking outwardly like that of *Philine,* yet the sides of the foot have stronger and more wing-shaped projections. — 2 species.

Found in the Mediterranean.

GASTROPTERON. *Meckel.* (Opiptera *Rafin;* Sarcopterus *Rafin;* Parthenopea *Oken.*) — No trace existing of a *shell. Animal,* the foot lengthened on each side into a very large rounded wing, which can be thrown over the back, meeting each other; the head lobe is also thrown back on the side, thus forming a tube; the bulk of the body is oval; the gills lie free on the right side; behind is a feather-formed appendage; there is no hard gizzard.

One species, *A. Meckelii* of the Mediterranean.

* Forbes's British Moll.

ATLAS. *Lesueur.* — *Shell* none. *Animal,* having the body divided into two parts, which are connected by means of a kind of stalk; the hinder portion is oval, the front enlarged and thickened outwardly, and the edges ciliated; a small distinct foot beneath, and a pair of very small ear-shaped tentacula above; the anal opening is in the middle of the right side of the hinder portion; the breathing organs are not yet known.

A. Peronii is the only species.

OXYNOË. *Rafinesque.* — *Shell* Bulla-shaped, with simple whorls and spire, situated at the fore part of the back of the *animal,* which has the gills obliquely streaked at the edges; the mantle extended into two side wings; and two inflexible tentacula.

One species found in the Mediterranean.

ACTÆON. *Montf.* (Solidula *Fischer;* Tornatella *Lam.;* Dactylus *Schum.;* Speo *Risso.*) — *Shell* small, oval, and usually transversely striped; spire small, and pointed; columella having one or two thick plaits; outer lip thin; operculum small and horny. *Animal,* not investing the shell; the head is a quadrate disk, bilobed in front, and bearing two broad obtuse, semicircular lobate tentacula, capable of reflexion on the shell posteally, at the upper or inner base of which are impressed two small eyes; no central teeth on tongue, many uncinated laterals; mantle closed in front, its lateral lobes slightly reflected on the shell; branchial plume single; foot oblong, truncate in front, obtuse behind.* — few species; also fossil.

Actæon fasciata.

The shells of this genus are found on the shores of the

* Forbes's British Moll.

Indian Ocean, Senegal, &c.; and one species, *Actæon* (Tornatella) *fasciata*, inhabits our own coasts. Mr. Forbes says that when this species is handled, the animal gives out a milky fluid with a purplish tinge, the body being of a milky-white hue. Philippi remarks that the animal greatly resembles that of the *Bulla*.

Iteria. *Mathéron.* — *Shell* ventricose, egg-shaped, or swollen, almost cylindrical, the spire in the young shell not projecting, when older it is perceptible; the whorls are numerous, the last very large; the apex blunt; the aperture longitudinal, narrow; before [or under] spreading, thickened outwardly, or lengthened into an indistinct canal; the outer lip plaited inwardly; the inner also plaited. — 1 species, fossil.

I. (Tornatella) *Cabaneti* of D'Orbigny is a fossil.

Actæonella. *D'Orb.* — *Shell* short, ventricose, or bladder-shaped, smooth; the spire closed in, or free, always very short; the aperture small, longitudinal, enlarged before, behind strongly contracted, where, in every stage, it is furnished with a slight canal; the outer lip is sharp; the edge of the inner lip very strongly thickened, and having three large, slightly oblique folds, which extend to the inside. — Fossil.

These shells are distinguished from *Bulla* by the folds of the columella, and from *Actæon* by the absence of transverse stripes.

Volvaria. *Lam.* — *Shell* cylindrical, with oblique punctured stripes; the aperture linear, and scarcely notched beneath; the outer lip thin; inner with four plaits at the lower part. — 2 species, fossil.

Volvaria concinna.

Found in the London and Paris formations.

CYLINDRITES. *Lycett.* — *Shell* cylindrical; the spire small, pointed, not always extending beyond the whorls, which are numerous, flat, and separated by means of a furrow; the aperture is long, narrow, almost linear, without a notch at the base; the inner lip has at the base two somewhat curved folds. — 6 species, fossil.

ORDER VI.

PULMONATA.

THE animals of this extensive order breathe air through a lung cavity, or have proper gills. They live on land, or in fresh water, and have mostly a spiral shell.

Family 1. — *ONCIDIACEA.*

The bodies of these animals are naked, and are joined in their entire length with the foot: they have gills close to the lung cavity. They do not form a shell, and for this reason the names of the genera alone will be given.

Oncidium *Buchanan;* Peronia *Blain.;* Onchidella *Gray;* Buchannania *Lesson;* Oris *Risso.*

Family 2. — *LIMACEA.*

The body of the animal is naked, or possesses only a rudimentary inner shell, or a small one which covers only part of the body; the latter is joined in its whole length with the foot; there are four feelers generally, of which two bear the eyes on the points. — All are terrestrial.

VAGINULUS. *Fer.* (Veronicella *Blain.*) — No *shell.*

INCILARIA. *Benson.* — No *shell.*

LIMAX. *Lin.* (Phosphorax *Webb.*) — *Shell* internal, and rudimentary; form irregular, nearly square, and having no spire, somewhat like a nail in shape. *Animal* long; head tolerably distinct, having two pair of tentacula, the upper ones furnished with eyes; foot long and large. — Many species.

Limax maximus.

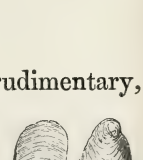
These animals are common everywhere, but particularly in the neighbourhood of ditches and damp gardens, where they often cause great damage. They are usually known by the name of slugs, of which there are eight species found in England.

PHILOMYCUS. *Rafinesque.* — No *shell.*

GEOMALACUS. *Allman.* — No *shell.*

JANELLA. *Gray.* — No *shell.*

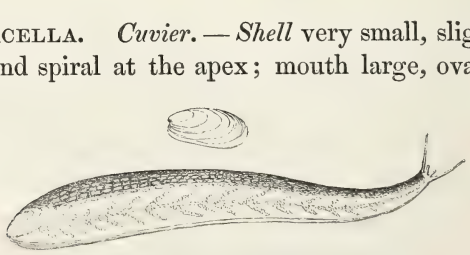
PARMACELLA. *Cuvier.* — *Shell* merely rudimentary, shaped somewhat like a spoon, and defending the organs of respiration; spire very short. *Animal,* oblong, slug-like; four tentacula, two of which have eyes, and all are retractile; foot large. — 6 or 7 species.



Parmacella caliculata.

From Mesopotamia and other warm countries.

TESTACELLA. *Cuvier.* — *Shell* very small, slightly ear-shaped, and spiral at the apex; mouth large, oval, having



Testacella haliotoides.

the left lip rolled inwards, and the right sharp. *Animal*, body long like a slug, with the shell only covering the extremity; head distinct, having four tentacula, the two largest of which have eyes at the summit; foot long. — Few species.

This animal is rarely observed, as it burrows under ground, where it lives upon earth-worms. It seizes them with its long revolute tongue with great rapidity, and firmly holds those even much larger than itself, so that their utmost endeavours cannot effect an escape. A worm, an inch long, having been placed under a glass with three of these *Testacella*, soon fell a prey to one of them; and another, three inches in length, although at first it succeeded in disengaging itself, was finally devoured by them, as well as two others of the same size which were subsequently introduced: two of the slugs were observed to make a simultaneous attack upon one of the worms, each commencing its repast at a different extremity.

The *Testacella haliotoidea* is found in Europe; and M. Ferussac mentions a species, the *Testacella Maugei*, which was brought from Teneriffe by Maugé to the Botanic Garden at Bristol, where it has become acclimated. As natives of England, they were first noticed by Mrs. Smith of Bristol, who found the shells of *T. scutulum* scattered about her garden, and afterwards discovered the animal. They are common in Guernsey, and have been found at Lambeth. In winter they bury themselves from one to two feet deep in the earth, and are mostly above the surface from August to November.*

PLECTROPHORUS. *Fer.* — *Shell*, a small testaceous appendage fixed to the posterior portion of the animal, which otherwise resembles the Limax. 3 species, from Teneriffe.

* Gray.

Family 3. — *HELICEA.*

The body of these Mollusca is more or less spirally formed, separated from the foot, and covered by a spiral-formed unoperculated shell; the tentacula are four, on two of which the eyes are placed at the extremity. — Terrestrial.

This extensive family has been divided by several writers into various genera. Ferussac mentions five: — Helixarion, Helicolimax, Helix, Vertigo, and Partula. Lamarck has eight: — Helix, Carocolla, Anastoma, Pupa, Clausilia, Bulimus, Achatina, Succinea. Beck has thirteen: — Vitrina, Helicarion, Helicopsis, Nanina, Stenopus, Daudebardia, Helix, Artemon, Bulimus, Achatina, Pupa, Clausilia, Succinea. Pfeiffer arranges them in seventeen genera, which is the plan adopted by Philippi, as follows: — Daudebardia, Vitrina, Succinea, Helix, Anastoma, Tomigerus, Streptaxis, Odontostoma, Bulimus, Achatinella, Achatina, Pupa, Cylindrella, Megaspira, Balea, Tornatellina, and Clausilia.

DAUDEBARDIA. *Hartmann.* (Helicophanta *Fer.*) — *Shell* dextral, very thin, roundish, almost ear-shaped; spire scarcely projecting; the aperture very large, half-moon shaped. *Animal,* too large to enter the shell, and exactly similar to *Limax.* — Few species.

Found in Europe.

Daudebardia brevipes.

VITRINA. *Draparnaud.* (Cobresia, Helixarion, Helicolimax, Hyalina, Limacina.) — *Shell* small, very thin, flattened, terminated by a short spire; the last whorl large; mouth large, and rather oval; columella not perforated. *Animal,* body long, the shell only covering part;

four tentacula, cylindrical and retractile, two of which have eyes at the summit; foot separated from the body by a furrow.—About 30 species.

These Mollusca live in shady and damp places, among moss and short grass, and are found in Great Britain, Germany, Sweden, Celebes, &c. The little shells are distinguished from young specimens of the *Helix* by their never being umbilicated or perforated; they greatly resemble them in other particulars, and are often mistaken for the young state of the garden snail.

Vitrina Draparnaldi.

Succinea. *Draparnaud.* (Cochlohydra *Fer.*).—*Shell* oval, small, thin, and transparent; spire very short, consisting of only two or three whorls; right lip thin, left smooth; aperture large, oblong; no operculum. *Animal* bulky; head with four tentacula; the upper ones stout and inflated, the lower very short; foot very large; dentition intermediate between *Helix* and *Vitrina.**—About 60 species; also fossil.

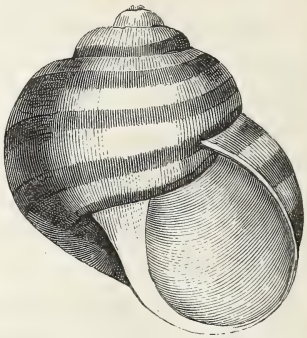
Succinea amphibia.

The animal cannot entirely enter its shell; it lives upon herbs and shrubs on the borders of water, and appears to be almost amphibious. Sowerby remarks that it is sometimes below the surface of the water, but that it does not live habitually in it, as it breathes air. The species are found in England, many parts of Europe, Van Diemen's Land, &c. &c.

Helix. *Lin.*—*Shell* globular, convex, or flattened; spire not much elevated; mouth wide, not long, placed very obliquely to the axis of the shell; lips disunited by the projection of the last whorl, never pearly, but polished;

* Forbes's British Moll.

umbilicus either covered or visible. *Animal,* moderately large in proportion to the shell; head with four developed tentacula; mantle not reflected over the shell; tail lanceolate, and never truncated; foot often ample; tongue with the edge teeth serrated.*—About 1400 species†; also fossil.



Helix.

Throughout the whole of nature there are very few classes of animated beings more abundant, or more completely spread over the surface of the earth, than this genus, the *Helix*, or common snail. It is found even in the most barren and desert places, feeding upon the miserable specimens of vegetation which may be found, and existing in great numbers in places entirely deserted by the other ranks of creation. It is equally adapted to the hottest and the coldest climates, the most cultivated and most barren situations. The *Helix aspersa,* or common garden snail, may be found at the foot of Chimborazo, in the forests of Guiana and Brazil, and almost all over the continents of Europe, Asia, and Africa; even the great desert of Zahara is peopled by them. On the shores of the Mediterranean they are a valuable article of food, when boiled in the shell and eaten with rice; and it has been conjectured that they formed a portion of the food of the Israelites both in the desert and on their way to the Red Sea, the country in that neighbourhood being described by travellers as having a herbage under the trees completely covered with snails of a large

* Forbes's British Moll. † Reeve's Iconica.

size. They form in some countries, as Switzerland, Brittany, and some parts of Germany, a considerable article of commerce, and are fed by thousands in places made on purpose for them. It is supposed the Romans also fattened the *Helix pomatia* in the same manner; even at the present day the *Helix aspersa* is sold in Covent Garden market, to be used, boiled in milk, for diseases of the lungs. They are also sent to America from this country as a delicacy.

These animals become torpid about October (at least in England), and remain so during the winter, having first closed the aperture of their shells with an epiphragma which they throw off, and emerge when warm weather returns; some of them form two or three of these doors, one within the other, so as completely to exclude the cold, and others bury themselves in the earth. The *Helix aspersa*, which is the pest of our gardens, is more influenced by the weather than many of the smaller sort; for upon the first appearance of cold these molluscs creep into crevices and under stones, clustering and clinging together as if they were capable of communicating warmth by association. In the centre of the epiphragma is an exceedingly minute orifice, communicating with the lungs; and this minute hole, though not large enough to admit a drop of water, is of sufficient capacity for the passage of air for the purpose of extremely slow, but not totally extinct respiration.*

Many instances have been known of the great tenacity of life which snails possess. A gentleman received some species closely packed with marine shells from the Mauritius; the day after they were unpacked they were discovered wandering about, apparently uninjured from their

* Gray's edition of Turton's Manual.

long and close confinement; some lived ten days, but a want of proper food or the uncongenial climate then killed them. Mr. Wollaston told Mr. Woodward that specimens of two Madeira shells, *H. papilio* and *tectiformis*, survived a fast and imprisonment in pill boxes of two years and a half; and that a large number of the small *H. turricula*, brought to England at the same time, were *all* living after being inclosed in a dry bag for a year and a half. There are instances, also, of snails having been for some years in a cabinet, and on the shells being put into warm water to be washed, the animals made their appearance alive, or, as the following curious circumstance will show, without the incitement of the warm water, as related by Dr. Baird: —"An individual of the Desert snail (*H. desertorum*) was fixed to a tablet in the British Museum, on the 25th of March, 1846, and on March 7th, 1850, it was observed that he must have come out of his shell in the interval (as the paper had been discoloured apparently in his attempt to get away); but finding escape impossible, had again retired, closing his aperture with the usual glistening film; this led to his immersion in tepid water and marvellous recovery. He is now (March 13th, 1850) alive and flourishing, and has sat for his portrait."*

These Mollusca have the power of repairing their bodies when injured as well as their shells: a horn, or even the whole head, if cut off will be reproduced, the animal keeping within its shell until the parts are replaced; the head, however, requires some months to be perfected.

The *H. pomatia* is said by some authors to have been introduced into this country from abroad, but others suppose it to be indigenous. It is almost confined to chalky and gravelly districts. The eggs of this species are glo-

* Woodward's Recent and Fossil Shells.

bular, covered with a white opaque skin, and are about two and a half lines in diameter. Mr. Cuming says that the *H. sarcinosa* deposits a great number of small eggs on the leaves of the trees in the dark forests of the Philippines, and that after the eggs are deposited on the leaf chosen, the animal wraps it round them subconically, so as to resemble in a degree the small paper wrappers in which grocers hand their wares to their customers.*

Helices are sometimes curiously deformed: Mr. Gray mentions having seen a specimen of *H. aspersa* which had been curiously thrown out of its proper shape by a young specimen having attached itself to the side, doubtless during the dry season, and not awaking from its torpor so early as its older companion, the latter, when it commenced increasing the size of its shell, threw its new whorl partly over the smaller individual, which was thus inclosed in a prison formed by its own shell. In this instance the form of the larger specimen was not much altered, but about one-half of the young shell projects above the spire.† In the British Museum there is a specimen of the *H. terrestris* with a small stick passing through it, and projecting from the apex and umbilicus. Mr. Pickering has in his collection a specimen of *H. hortensis* which got entangled in a nut-shell when young, and growing too large to escape, had to endure the incubus to the end of its days.‡

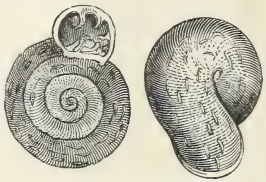
This extensive group has been divided by some writers into a great many different genera; for instance, Beck makes forty-five, and Albers sixty-eight, but very few of them have been generally adopted.

Those who wish to be particularly acquainted with the

* Pro. Zool. Society, 1840. † Philosophical Trans. 1833.
‡ Woodward's Recent and Fossil Shells.

genus will find the most complete account of the species in Mr. Reeve's "Conchologia Iconica," accompanied by the most beautiful illustrations.

ANOSTOMA. *Fischer.* (Tomogeres *Montf.*; Angystoma *Schum.*) — *Shell* orbicular; spire obtuse; mouth toothed, and turned upwards in the adult, nearly reaching the level of the apex. *Animal,* like that of the *Helix.* — 2 species, recent.



Anostoma globulosa.

The structure of this extraordinary shell proves, that in completing the last whorl, the animal carries it with the apex downwards, instead of its natural position upwards, which is the case with all other shells, and even with itself when young. It is very rare, and is brought from the East Indies. — Only 2 species are known, *Anostoma depressa* and *globulosa.*

TOMIGERUS. *Spix.* — *Shell* conoidal, the last whorl drawn forward in such a manner that from the base to the opening of the umbilicus extends a horizontal furrow, which separates the two parts of the last whorl from each other; the aperture is oval, and by means of numerous teeth very much contracted. *Animal* not known. — 3 species.

From Brazil. Deshayes places these shells with Bulimus; Beck with Anostoma; and Reeve with Scarabus.

STREPTAXIS. *Gray.* (Artemon *Beck.*) — *Shell* "ovate or oblong; when young sub-hemispherical, deeply umbilicated, with rapidly enlarging whorls; at length the penultimate whorl is bent towards the right and dorsal side of the axis, and the umbilicus becomes depressed, and often nearly closed; the mouth is lunu-

Streptaxis contusa.

late, the edge slightly thickened and reflected, and often with a single tooth on the outer side of the inner lip."*— 23 species.

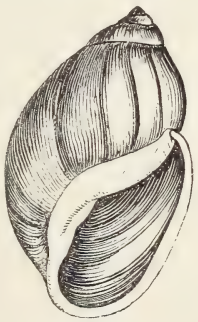
The shells are found in South America, Senegambia, and India, and are separated from *Helix* on account of the eccentricity of the penultimate whorl.

PROSERPINA. *Gray.* (Odontostoma *D'Orb.*) — *Shell Helix*-shaped, the base covered with a shining callosity; the aperture has inner plaits; the lips are plain and sharp. *Animal* unknown. — 5 species.

Proserpina.

Found in Cuba and Jamaica.

BULIMUS. *Brug.* — *Shell* oval, turreted, last whorl large; aperture having the margins disunited at the upper part, long, not wide; lip thickened and reflected in the adult; spire obtuse, but much more prominent than in the *Helix*. *Animal* very like the *Helix*. — 662 species†; also fossil.



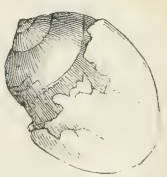
Bulimus oblongus.

These shells are found in almost every part of the world, from the torrid to the frigid zones; in the former they attain a large size, and are beautifully marked with lemon, amber, and sea-green, which colours rarely exist amongst other shells. Many of the species are reversed. They are more commonly found on islands, or on the margin of the sea amongst rocks and trees, than in the interior of the country, but Mr. Cuming has brought them from the arid

* Sowerby's Conch. Manual. † Reeve's Iconica.

plains on the west side of the Andes, from the dense woods of South America, and from the luxuriant open forests of the Philippines. The genus is most exquisitely illustrated in Mr. Reeve's "Conchologia Iconica."

The eggs of the *B. hæmastoma* are large, even sometimes reaching the size of a pigeon's egg, and are represented in the annexed figure. Edwards in his voyage up the river Amazon says, "Frequently we found the eggs of the *B. hæmastoma;* they were nearly an inch long, white, and within was generally the fully formed snail-shell, and animal awaiting its egress." This mollusc often cements leaves together to protect the eggs from view.



Egg of B. hæmastoma.

A living specimen of the *Bulimus ovalis* was once brought from Rio Janeiro, and placed in a hothouse at Chiswick; it lived for more than a year, and fed principally on lettuces and cabbages, the former of which appeared to be its favourite food. It would sometimes, after devouring part of a large lettuce, remain for some days without touching food or moving from the spot. During the day it was usually in a dormant state, and remained in the shade; but towards evening, when the house became damp and warm, it would move about.

Some specimens that were brought from Chili to this country, continued in a state of torpidity for seventeen or eighteen months, and one even more than two years, and then revived. They were sent to Messrs. Loddiges' gardens, at Hackney, where they lived for eight months in a hot-house fitted for palm-trees: they had constructed a parchment-like epiphragma, which they were observed partly to eat when they revived. They had been packed in cotton, in a box, from the period of their capture. Some large specimens, brought from Valparaiso by Lieut.

Graves, revived after being packed some for thirteen, others for twenty months. Mr. Cuming brought many new species from South America. The *B. rosaceus* he found adhering to the under side of stones, generally among bushes, and close to the edge of the sea shore within reach of the spray. He also met with them at the top of hills about one thousand feet above the sea; they were adhering to the lower leaves of an aloe-like plant. In the spring they burrow in the sand, and lay their eggs about two inches below the surface. When they hybernate, they adhere so fast to the stones and plants that they can hardly be taken without breaking the shell.* One species, the *B. decollatus*, as it advances in age always loses the upper volutions; but whether from accident or design appears uncertain. It, however, generally closes up the broken end; and the probability is, that as the animal enlarges in growth it recedes from the smaller volutions, closes them up, and these neglected portions fall off. Turton mentions a colony of them being discovered in a greenhouse in Devonshire, lodged in the earth under the wood-work, whence they wandered abroad in the summer. No foreign earth was ever known to have been admitted into the house; and they were considered by the gardeners as natives.

Other species are met with in such numbers (particularly *B. acutus*, in some parts of Cornwall), that it is impossible to take a step without crushing them. It is the prevailing opinion that they contribute much to fatten the sheep which browse upon the herbage where they are met with, which is principally on sandy maritime pastures. Dr. Peoppig remarks that in some of the Society Islands it is scarcely possible to examine the leaf of a shrub with-

* Penny Cyclopædia.

out finding it studded with the smaller kinds of Bulimi. There are three small species found in England.

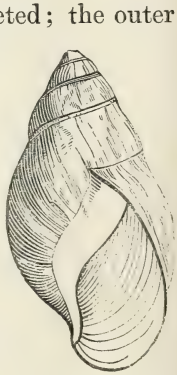
Beck has divided this genus into twenty genera, and Albers into fifty, but none seem to be generally adopted.

ACHATINELLA. *Swain.* (Helicteres *Fer.*) — *Shell* rather small, conical, either sinistral or dextral, not umbilicated; whorls generally six or seven in number, and smooth; columella short, broadly appressed, callous, and mostly twisted; aperture rather small; lip simple, sometimes rather thickened, never reflected.* *Animal* not differing outwardly from that of *Helix.* — 45 species.†

Achatinella abbreviata.

Small beautifully coloured shells, bright, smooth, and elegantly banded with fine lines of black, or mottled with various colours. They are all found in the Sandwich Islands on bushes and trees.

ACHATINA. *Lam.* — *Shell* oval, or turreted; the outer lip thin, and never turned back or thickened; the inner notched at the base; aperture about half the length of the shell; no operculum. *Animal* very like that of the *Helix.* — 129 species‡; also fossil.



Achatina marginata.

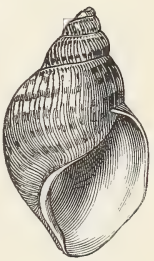
Some of the *Achatinæ* are the largest of all known land shells; they live always near water about trees, and are very plentiful in Africa, particularly at the Cape of Good Hope; some are found in the West Indies, but very few in Europe. Two small species, *A. acicula* and *A. lubrica*, are found in England, among the roots of trees at the base of limestone

* Reeve's Iconica. † Ib. ‡ Ib.

rocks. Many of them, as the *Achatina zebra*, are covered with a thick epidermis, but others are destitute: a few are constantly reversed or sinistral shells. The *Achatina columnaris* is one of the most remarkable of land shells; it is reversed, and the columella forms a winding pillar, visible within, quite to the summit of the spire.* A small species found in the South Sea Islands is strung by the natives, and used for an ornament.

Beck has ten, and Albers nine genera, formed out of Lamarck's genus Achatina.

HALIA. *Risso.* (Priamus *Beck.*) — *Shell* egg-shaped, not umbilicated, globular, thin, with short spire; the aperture triangularly oval, beneath with a deep notch; columella rolled in; outer lip sharp. — 1 species; also fossil.



Halia.

Brought from Portugal; but, according to Beck, the animal forms an operculum, and is therefore marine.

PUPA. *Lam.* — *Shell* cylindrical; spire long; aperture irregular, toothed, with the lips thickened, and unconnected at the upper part, the plaits on the left lip intervening. *Animal*, short, stout, acute behind, its upper tentacles developed, its lower ones short, or almost obsolete.† — 150 species; also fossil.

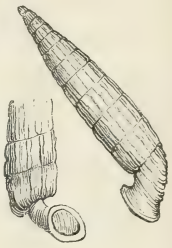
Pupa mumia.

They are found principally in Europe, but a few species are from America; they derive their name from the resemblance of the shell in shape to the *pupa* or chrysalis of an insect, and one is named the *Pupa chrysalis.* — Several species are found in England under stones, old walls, and in woods.

* Sowerby.

† Forbes's British Moll.

Beck divides this genus into eleven genera, and Albers into six.


Cylindrella.

Cylindrella. *Pfeiffer.* (Siphonostoma *Swain.*) — *Shell* with the spire excessively long, pointed, but the upper portions deciduous; aperture circular, spreading; the lips united and detached from the adjoining whorl. *Animal* not differing outwardly from that of *Helix.* — 45 species.

From the West Indies and Mexico: curious little shells, easily distinguished by the peculiar aperture which is detached from the adjoining whorl.

Beck divides the genus into three, and Albers into eight genera.

Megaspira elatior.

Megaspira. *Lea.* (Pyrgelix *Beck.*) — *Shell* Pupiform, remarkable for the length of the spire, consisting of twenty, fine, close-set, narrow, gradually increasing whorls; the outer lip simple, slightly thickened; the inner has a tooth on the body whorl, and two folds on the columella.* *Animal* unknown. — Few species.

Very singular shells, of which *M.* (Pupa) *elatior* is the type.

Balea.

Balea. *Prideaux.* — *Shell* "spiral, turreted, concentrically striated, sinistral, and covered with a thin brown epidermis; spire composed of numerous whorls, gradually increasing in size; aperture small, sub-quadrate; peretreme entire, slightly thickened, with a very slight fold on the columella; axis perforated.† *Animal* very like that of *Helix.* — 3 species.

* Sowerby's Conchological Manual. † Sowerby.

Small shells, very like *Clausilia*, but without the *clausium;* they are found in moss at the roots of trees in Britain and Europe. *B. fragilis* and *B. perversa* are British species.

TORNATELLINA. *Beck.* (Strobilus *Anton;* Elasmatina *Petit.*) — *Shell* not umbilicated, egg-shaped or lengthened; the aperture longitudinal, with irregular or thickened edges; the columella twisted and truncated, and having a fold. *Animal* unknown. — A few species.

From the South Sea islands.

CLAUSILIA. *Draparnaud.* — *Shell* fusiform or spindle-shaped, very slender; aperture irregular, rounded or ovate, almost always sinistral; lips united; a bony appendage attached to the inner lip, used as an operculum. *Animal,* short and usually broad, obtuse behind, with stout clavate upper tentacula, and very small lower ones. — 180 species; also fossil.

Clausilia macarina.

The *Clausiliæ* inhabit mosses at the foot of trees. Some species are English, and many are found in other parts of Europe, particularly on the borders of the Mediterranean; Russia and the Crimea produce a great number of curious species, which have lately been discovered: a few also are American. They are all small shells, the largest scarcely exceeding an inch in length. Within the mouth, in the last whorl but one, there is a little elastic shelly plate attached to the shell, and called a *clausium,* from which the genus takes its name. It is used to close up the aperture when the animal has retreated within its shell, and in that respect resembles an operculum, or epiphragma; but differs, inasmuch as the latter are either attached to the animal, or are loose and thrown off, whereas the *clausium* is

fixed permanently to the shell. Turton mentions five or six as natives of England. Many of the species are sinistral.

LYCHNUS. *Mathéron.* — *Shell* resembling when young a *Natica,* at a later period a *Helix,* when the last whorl of the shell allows the first only to be seen obliquely; the edges of the lips are folded back. — 2 species.

The species are known in the shallow fresh water at the mouth of the Rhone. D'Orbigny places them with *Tomigerus.*

Family 4. — *AURICULACEA.*

The body of the animals of this family can be entirely withdrawn into a spiral-formed shell, the aperture of which is narrow, and the inner lip is beset with thick plaits. The head has two conical tentacula, with the eyes at the base; no operculum. — Terrestrial, but living in damp places.

SCARABUS. *Montf.* (Pythia *Schum.;* Polydonta *Fischer.*) — *Shell* ovate; spire obtuse; whorls flattened; the last sometimes turned abruptly, forming an angle; aperture oval; teeth on both lips, the outer lip a little expanded; this expanded lip forms a varix on every half whorl, giving a very peculiar appearance to the shell. *Animal* described in the family. — 10 species.

Scarabus scarabæus.

Found at the roots of trees in woods in the East Indies, and in the islands of the Pacific.

AURICULA. *Lam.* — *Shell* oval, or lengthened, the whorls not flattened; the aperture small, not notched at the lower part, at the upper part contracted; the columella beset with one or several folds; the outer lip with no folds, sharpened, or thickened, and somewhat

curved outwardly, and often inwardly toothed; no operculum. *Animal*, having a head with a probosciform muzzle, furnished with two short tentacula, with eyes at their base; foot short, narrow, and not divided. — Many species; also fossil.

Auricula.

Several species are European; others are found on the banks of rivers in Brazil and Madagascar, and the Indian and American Islands. M. Rang remarks that the animals respire the air, and are found on rocks bordering the sea: he never found them in the water. The name is derived from a fancied resemblance to the ears of some animals; they are for the most part covered with an epidermis, but some are delicately sculptured.

Beck has divided them into seven genera, Gray into three. Philippi mentions the following as sub-genera: — Cassidula *Fer.;* Carychium *Müller;* Melampus (Conovulus *Lam.*) *Montf.;* Pythia *Gray;* Ophicardelus *Beck.*

Pedipes. *Adanson.* — *Shell* "sub-globose, longitudinal, thick, striated; spire equal to the aperture in length; aperture subovate; peretreme sharp, thickened within, modified by the last whorl; columella with three strong plaits on the inner edge; outer lip with one fold."* *Animal*, with the feather-formed tentacula in the middle of the head, the oval eyes at the base; the foot elliptical, underneath separated into two parts by a deep oblique furrow. — 4 species.

Pedipes.

The species much resemble Auricula, but are distinguished by the size, the thickness of the shell, and the

* Sowerby's Conch. Manual.

globular form. Natives of the West Indian Islands, the Sandwich Islands, Senegal, and the Red Sea.

Family 5. — *LIMNÆACEA.*

The body of the animal can be withdrawn entirely into a spiral-formed shell, which has always a sharp-edged outer lip, and the aperture modified by the last whorl but one; the feelers of the animal are of various forms, but are only two in number, with the eyes at the base; no operculum. — Living in fresh waters.

CHILINA. *Gray.* (Dombeya *D'Orb.;* Potamophila *Swain.*) — *Shell* thin, ovate; spire acute; aperture oval, longer than wide, and entire at the base; outer lip thin and simple; columella solid and sharply plaited.* *Animal,* with two entire, short, flat, angular feelers, in the middle of which the eyes are placed; two strong, side appendages to the mouth; the opening to the breathing hole has on the right a very long canal projecting forward, which lies in the hinder angle of the aperture of the shell. — 13 species.†

Chilina.

Found in the rivers of La Plata and South America.

LIMNÆA. *Lam.* — *Shell* oval, inflated, thin, almost horny; spire small and pointed; aperture oblong, sometimes very large; occasionally a fold on the columella lip; no operculum. *Animal,* with a broad head and snout; tentacula two, triangular, rather short, broad, the eyes placed at their inner bases; mantle even edged,

Limnæa stagnalis.

* Reeve's Iconica. † Sowerby.

in some species reflected on the shell*; foot broadly lanceolate, or subovate; tongue armed with many transverse rows of numerous stout uncinated teeth, with furcated hooks, flanking a minute, simple, hooked, central denticle.† —52 species; also fossil.

This genus was united with *Physa*, as the shells are similar in most respects, differing chiefly in the direction of their spires, and also in the oblique plait on the columella; but they are separated now, as the animals are found to differ. They are abundantly found in our rivers and ponds (particularly the latter, as they appear to prefer stagnant water), and in other parts of Europe, Africa, and America: one or two species have been mentioned as natives of India. They feed on aquatic plants, coming to the surface of the water for air; the eggs, which are in great numbers, are deposited on stones, and the stems and leaves of vegetables, in long masses enveloped in a glairy substance. Darwin mentions finding *Lymneæ* in great numbers in a lake near Rio de Janeiro, into which the inhabitants assured him the sea annually, and sometimes oftener, entered, and made the water quite salt.

There are nine British species. Beck arranges the fifty-two species under four genera: — Omphiscola *Rafin.*; Limnophysa *Fitz.*; Limnæa and Gulnaria *Leach.*

Amphipeplea. *Nilson.* — *Shell* thinner than that of the last genus, more delicate, almost globular, with very short spire, and very wide aperture. *Animal*, differing from that of *Lymnæa*

Amphipeplea glutinosa.

* Philippi places those that have the mantle reflected over the shell in the next genus.

† Forbes's British Moll.

by the very large mantle which covers the shell. — 4 or 5 species.

From the Philippines, Germany, and Holland.

PHYSA. *Draparnaud.* (Bulinus *Adan.*) — *Shell* oval or oblong, smooth and thin; aperture contracted above; inner lip smooth, outer very thin; no operculum; shell generally reversed. *Animal* having two long tentacula, with eyes at the base; foot long; mantle large, so as to cover part of the shell, and very transparent. — 14 species; also fossil.

Physa fontinalis.

These Molluscs are most frequently found on the under side of the leaves of aquatic plants: they have also a very singular way of adhering to the surface of the water with the shell downwards, and they crawl in that direction with as much apparent ease as on a solid surface, occasionally letting themselves down gradually by a thread. This power of crawling under water against its surface is not wholly confined to this genus. Many species are found in Europe, others in Africa, some in California, and other parts of America.

There are two British species, *P. fontinalis* and *hypnorum.* Beck divides this genus into Aplexa of *Fleum.* and Bulinus.

PHYSOPSIS. *Krauss.* — *Shell* sinistral, umbilicated, thin, egg-shaped; the aperture longitudinal; the outer lip notched, the inner twisted, plaited and truncated at the base; no distinct columella edge. — 1 species.

From Southern Africa.

PLANORBIS. *Müller.* (Coretus *Adan.*) — *Shell* flat and disk-shaped; mouth semicircular, and removed from the axis of the shell; whorls apparent on both sides;

umbilicus large; no operculum; many species reversed. *Animal,* with a stout proboscis-shaped head, having two long tentacula with eyes at the inner base; foot obtuse behind, and short; tongue with transverse rows of teeth. —64 species; also fossil.

Planorbis corneus.

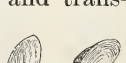
This genus inhabits lakes and ditches in every part of the world; many species are common in England, and one or two are found in America with thickened rims; some of the species are so much flattened that it is difficult to distinguish the upper side from the lower. They are usually thin and fragile, devoid of any bright colour, and do not possess any operculum.

Philippi places Fleming's genus Segmentina as a subgenus.

Camptoceros. *Benson.* — *Shell* lengthened, sinistral, with the whorls few, drawn out, but unconnected; spire projecting, almost erect; the aperture longish, free, and entire; the lips connected and sharp. *Animal,* with two blunt, thread-formed feelers, with large eyes between them; muzzle moderate; mantle not projecting over the aperture of the shell; foot short. —1 species.

C. terebra is brought from Bengal.

Ancylus. *Geoffroy.* — *Shell* oblong, small and transparent; apex rather pointed, and bent to the right; somewhat resembling a *Patella* in form, but the apex is posterior, whereas that of the *Patella* is anterior. *Animal,* head very large, having two large cylindrical tentacula, with eyes at the base; foot large. —5 species; also fossil.



Ancylus fluviatilis.

The *Ancylus* is found only in fresh water, in ponds and

brooks, where it attaches itself to reeds and other aquatic plants, and also to stones; it moves about also just under the surface of the water, with the back downwards. It is nearly amphibious; for in summer, when the brooks are dried up, it remains in the soft mud until the return of rain, indeed it is also often found out of the water, living only within reach of the spray of a waterfall.*

Family 6.—*AMPHIBOLACEA.*

The body of this Mollusc can be withdrawn wholly into a spiral-formed shell, with an entire roundish aperture; the head is flat, broad, and bordered, without feelers; the eyes are sessile; it possesses an operculum.—Found in brackish water.

Amphibola. *Schum.* (Ampullacera *Quoy* and *Gaim.*; Thallicera *Swain.*)—*Shell* rather thick and globular; aperture round or oblique, having the lips united; spire short; umbilicus deep; operculum horny, thin, and having sometimes a projection. *Animal*, head broad, flat, edge turned back, bearing on the upper side two remote eyes; no tentacula; foot short, four-sided, with a furrow in the front; the lung cavity large, communicating with the air by means of an opening in the right edge of the mantle; the parts of the mouth are not yet described; there exist two linear split glands; the craw is muscular, as in Auriculacea and Lymnacea.—2 or 3 species; also fossil.

Amphibola avellana.

This Mollusc is found in great abundance in New Zealand, in pools of brackish water, buried in sandy mud.

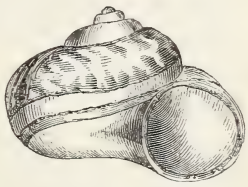
* Turton's Manual.

When the animal is touched it enters very deeply into its shell, at all times is hidden by it, and sometimes even fills the entrance with earth. The New Zealanders fish for, and use it as food.

Family 7.— *CYCLOSTOMACEA.*

The body of these Mollusca can be drawn entirely into a spiral shell, which has a round, entire aperture; the head has two tentacula, with eyes placed either on the outer or inner side; they possess an operculum. — Terrestrial.

Cyclostoma. *Lam.* — *Shell* globose, either flattened or turreted; aperture circular; the margin of both lips united and slightly turned back; closed by a shelly or horny operculum. *Animal,* with a proboscidiform muzzle; two subulate tentacles, eyes at their external bases; foot ovate; mantle quite free.* — 175 species†; also fossil.



Cyclostoma volvulus.

The shells of this genus vary very much in form; some being very flat, others having the apex lengthened out, but they all have the aperture round. They are found principally in the Torrid Zone, in the vicinity of lakes and rivers; but one species, *C. elegans,* is a native of Britain, and is found in woods amongst moss and stones. The inhabitant, it is said, will survive imprisonment many months, like many other operculated Molluscs. Guilding mentions that *C. suspensum,* a West Indian species, suspends itself from the trees by a few threads.

* Forbes's British Moll. † Sowerby's Thesaurus.

This very extensive genus has been divided into as many as twenty-seven genera, by continental and English writers, as follows: — Cyclotus *Guilding;* Pterocyclus *Benson*; Craspedopoma *Pf.;* Aulopoma *Troschel;* Cyclophorus *Montf.;* Leptopoma *Pf.;* Alycaeus *Gray;* Deplommatina *Benson;* Megalomastoma *Sw.;* Cataulus *Pf.;* Pupinella *Gray;* Rhegostoma *Ag.;* Jamaicia *Adams;* Licina *Gray;* Choanopoma *Pf.;* Adamsiella *Pf.;* Lithidion *Gray;* Otopoma *Gray;* Cyclostoma *Lam.;* Tudora *Gray;* Leonia *Gray;* Cistula *Gray;* Chondropoma *Pf.;* Pomatias *Studer;* Realia *Gray;* Omphalotropis *Pf.;* Bourciera *Pf.*

FERUSSINA. *Grateloup.* (Strophostoma *Desh.*) — *Shell* egg-shaped, or tolerably globular: the aperture oblique, simple edged, untoothed, turned up towards the spire, and the edge thickened; a wide or narrow umbilicus. — Fossil.

Ferussina.

These shells seem to be to *Cyclostoma*, what the *Anastoma* is to *Helix.*

PUPINA. *Vignard.* — *Shell* cylindrical, somewhat turreted, highly polished, the spire more or less depressed, and obtuse; the last whorl but one usually inflated, the last a little contracted; aperture nearly circular; the outer lip thickened, a little reflected, and generally cut near the inner lip, with a small canal; operculum horny, and spiral.* *Animal* not known. — 12 species.

Pupina Nuneziі.

Beautiful little shells from the Philippines, New Guinea, &c., with a very polished exterior, and often quite transparent.

* Reeve's Iconica.

STOASTOMA. *Adams.* — *Shell* globose, with a semicircular aperture; the outer lip not reflected, but produced beyond the inner lip, from which it is separated by a little groove; operculum calcareous, outwardly deeply concave, with laminated, slightly elevated, irregular increasing striæ. *Animal* not known. — 12 species.*

Stoastoma.

Very small shells, of a globose form, found in Jamaica.

HELICINA. *Lam.* (Oligyra *Say;* Pitonnillus *Montf.*) *Shell* flattened; mouth semicircular, closed by a horny

Helicina occidentalis.

operculum; lip thickened, and columella often also thickened. *Animal*, having a head furnished with a proboscis, and two tentacula, with eyes at the base on tubercles; foot rather short. — There are 90 species; also fossil.

Some species live on trees, and others on the ground; they are natives of the West Indies and other countries of the torrid zone. The operculum, which is permanently attached to the foot, is not spirally formed, but in concentric layers. — The *H. viridis* from St. Domingo, is of a smooth shining green colour.

Philippi places the following as sub-genera: — Trochatella and Lucidella *Swain.*

* Sowerby's Conchological Manual.

Acme. *Hartmann.* (Acicula *Hartm.;* Pupula *Agass.*) *Shell* sub-cylindrical, with a blunt apex; mouth ovate, simple, thin, slightly reflected over the pillar, forming a slight perforation.* *Animal,* very like that of *Cyclostoma,* but having rather slender and long tentacula; the eyes placed at their hinder bases; foot sharp behind.

Acme.

The type is *A. fusca,* found in Europe; *A. lineata* is a minute British species, living amidst fallen leaves.

Geomelania. *Pfief.* — *Shell* turret-shaped, not umbilicated; aperture entire, curved outwardly; the edge simple, reflected, and the base having an appendage. *Animal,* not satisfactorily described; an operculum. — 19 species.

These shells are found in Jamaica.

Truncatella. *Risso.* (Choristoma *De Cr.* et *Jan.*) — *Shell* cylindrical, turreted, and either broken off at the apex, or obtusely truncated; the whorls are smooth, transversely ribbed; aperture oval, and the lips united; operculum oval, and somewhat spiral. *Animal* with short diverging triangular tentacula, the eyes placed centrally at their inner bases; head bilobed, more or less muzzle-shaped; foot short, rounded at both ends.† — 15 species; also fossil.

Truncatella Montagui.

Mr. Reeve‡ remarks that the animal is probably amphibious, from the following experiment by Mr. Lowe: — "A specimen was taken out of the water by this gentleman on the coast of Madeira, together with several other aquatic Molluscs, and they were all put away together in

* Sowerby's Conchological Manual.

† Forbes's British Moll. ‡ Conch. Syst.

a dry tin box; five weeks afterwards the box was opened, and upon placing them in a glass of sea-water the *Truncatella* crawled forth alive, but the other Molluscs were dead."

They are called "looping snails" from their peculiar method of walking; Mr. Reeve says, "the foot is divided into two parts, and the animal acquires motion by contracting the space between them into the form of a loop."

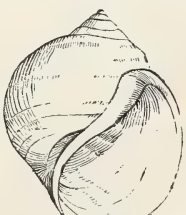
T. Montagui has been found on the British south shore, also at Scarborough, and in Scotland.

Menestho. *Moeller.* (Pyramis *Couth.*)—*Shell* turret-shaped, not decollated. *Animal*, according to a manuscript delineation of Moeller, is similar to that of *Truncatella*, except that the foot is lengthened, and the mouth simple, without a tongue membrane. — 1 species.

M. (Turbo) *albulus* is the species.

Family 8.—*AMPULLARIACEA.*

The body of the animals of this family can be wholly drawn into a spiral-formed shell, which has an entire aperture, angular above. The head is lengthened; each side is drawn out into a feeler-like appendage; there are two long tentacula, the eyes on short stalks on the outer base of them; in the lung cavity are also gills; an operculum. — Found in fresh waters only.



Ampullaria fasciata.

Ampullaria. *Lam.* — *Shell* generally large, thin, and globular; spire very short; mouth semicircular, with the lips united, the outer being acute; operculum thin and horny, rarely calcareous; the shell has an epidermis,

and an umbilicus varying in size. *Animal*, see the description of the family.—Nearly 100 species; also fossil.

The Mollusca forming this genus are found in the rivers of Africa, India, and South America, but have not been discovered in Europe or North America. Though found generally in rivers, one species, the *Ampullaria ovata*, inhabits Lake Mareotis, where the water is salt, and another the brackish water near Rio de Janeiro.* In South America they are called "Idol shells," and the natives hold them in high estimation. Some of the African species have reversed shells, and all that are natives of Africa and America have the operculum horny: those, on the contrary, which come from India, have it usually shelly, and are furnished with an internal groove for its reception parallel to the mouth, which is thickened.†

The animals possess the peculiarity of a large bag opening beneath, and situated on one side of the respiratory organs; this they fill with water, by which means they can exist for a considerable period out of their natural element. Specimens have been brought from Egypt to Paris alive, although packed up in sawdust; and, as a further instance, the following may be adduced. A box sent to M. Caillaud, containing a number of river shells from the Nile, was delayed four months on its road, and when it reached Paris was in such a state, from the putrefaction of the greater part of its contents, that they were all thrown into water. A few hours after a great number of living *Ampullariæ*, which had been shut up in this mass of putrefaction, were discovered creeping quietly about, and some of them lived four and six months after. They have also been found alive in logs of mahogany brought from Honduras to this country. Laidlay placed some in a drawer to ascertain the limits of their endurance, and

* Darwin. † Swainson, Zoological Illustrations.

found them alive after five years, although in the warm climate of Calcutta.* The Indian species lay globular eggs, of a pale green colour, about the size of small peas, which are found in clusters attached to sticks or other things in the water; when dry, they have a beautiful appearance.

Order VII.

NUDIBRANCHIA.

The animals of this order breathe by lungs of various forms, which are naked, and symmetrically arranged on the back; they never form a shell; from this circumstance the *names* of the genera will alone be mentioned in this work. Philippi enumerates them as follows:—

Family 1. — Doridiacea. Doris *Lin.*; Villiersia *D'Orb.*; Hexabranchus *Ehren.*; Atagema *Gray*; Goniodoris *Forbes*; Brachychlanis *Ehren.*; Triopa *Johnston*; Idalia *Leuckart*; Ancula *Lovén*; Ægires *Lovén*; Polycera *Cuvier*; Thecacera *Fleming*; Plocamophorus *Rueppell*; Ceratosoma *Gray*.

Family 2. — Tritoniacea. Tritonia *Cuvier*; Dendronotus *Alder.*; Doto *Oken.*; Duvaucelia *Leach*; Scyllæa *Lin.*; Nerea *Lesson*; Melibœa *Rang.*; Tethys *Lin.*; Bornella *Gray*.

Family 3. — Æolidiacea. Glaucus *Forster*; Æolis *Cuvier*; Pterochilus *Alder.*; Calliopea *D'Orb.*; Tergipes *Cuvier*; Gellina *Gray*; Lomanotus *Verany*; Stiliger *Ehren.*; Hermæa *Lovén*; Cloelia *Lovén*; Alderia *Allman*; Proctonotus *Alder*; Janus *Verany*.

* Woodward, Recent and Fossil Shells.

Family 4. — Placobranchiacea. Placobranchus *Hasselt;* Elysia *Risso;* Chalidis *Quatrefages;* Actæonina *Quatrefages;* Ictis *Alder.;* Fucicola *Quoy* et *Gaim.;* Dermatobranchus *Hasselt.*

Family 5. — Phyllidiacea. Phyllidia *Cuvier;* Hypobranchæa *Adams;* Pleurophyllidia *Stammer.*

Order VIII.

HETEROPODA.

The foot of the animals of this order is changed into a vertical fin, which serves for swimming; the gills vary, sometimes entirely absent; the mouth is armed with great horny hooks, for the seizing and tearing the prey; sometimes the body is prolonged into a tail, which at the end has a fin; sometimes there are feelers, sometimes none; the same may be said with regard to eyes. The shell is sometimes present, sometimes absent, and either covers the whole or part of the body. — All marine.

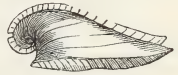
The Heteropoda are Molluscs which swim about freely in the open sea, chiefly making their appearance at night, or in the evening. They are limited to the warm and temperate zones, and (especially in the former) cover the sea in millions, and this for many nights in succession, so that with a net vast numbers may be caught. Like the Pteropoda they are always swimming about, and have never been observed to fix themselves, but their motions are much slower; the movements of the *Sagitta* very much resemble those of fish. Most Heteropoda are colourless, and transparent as water. What they feed on is not

very accurately known any more than their internal structure. The eggs of the *Pterotrachœa* are very often seen in a fine long band, like a thin thread, hanging to their kernel. The Atlantacea apparently form a connecting link with the Pteropoda.

Family 1.—*NUCLEOBRANCHIATA.*

Body naked, with a protuberance, kernel, or nucleus on the back, in which the liver, &c. are contained; on this are placed the gills, which consist of feathered, or conical lobes, and are in some genera covered by a shell; underneath the body there is a nearly circular fin.

CARINARIA. *Lam.* — *Shell* glassy, transparent, very thin, conical, flat at the sides, keeled, and having the apex recurved; serving as a covering to the gills. *Animal,* body long, fusiform; head distinct, on the base of which are two long thread-like tentacula, on which the eyes are placed; the nucleus is stalked, and covered by the shell; the tongue has in the middle line a three-pointed tooth, and on each side three long hook-shaped teeth. — 5 species.



Carinaria.

The three best known species of this singular genus, are *Carinaria vitrea,* so called from its resemblance in substance to glass, found in the African seas, where it is very rare; *Carinaria fragilis,* which is extremely delicate in its texture, and inhabits the Mediterranean; and *Carinaria cymbium,* or *boat-shaped Carinaria,* which is not larger than a grain of sand, and can only be seen with the assistance of a microscope, brought from the Eastern Ocean and Mediterranean Sea; it is found on the coast near Nice, and feeds on small *Medusæ* and other gelatinous substances, as also on minute fish, and occasionally the more feeble of its own species.

The Mollusca which form these shells are very transparent, but are possessed of lively and brilliant colours; they only appear on the surface of the sea during calms. The shells are comparatively small, as they only cover the circulating and respiratory organs; they were formerly very rare (specimens having been sold for one hundred guineas), but are now more common: they are seldom perfect.

CARDIOPODA. *D'Orb.*—No *shell.* *Animal* fusiform, the head very thick, not distinct; two tentacula before the eyes; a stalked nucleus without shell, but which in form resembles the embryo whorls of the *Carinaria.*—2 species.

Found in the Atlantic.

CERATOPHORA. *D'Orb.*—No *shell.* *Animal,* with a fusiform body, with distinct head, and two long tentacula before the eyes; the nucleus naked.—1 species.

From the Pacific Ocean.

PTEROTRACHEA. *Forskal.* (Firola *Peron* and *Les.;* Hypterus *Ralin.*)—*Animal* fusiform, with a distinct head, which is prolonged into a pointed snout, at the end of which is the mouth; the eyes, very perfectly organised, are at the base of the head; no tentacula, but in their place a pair of small points (rudimentary) before the eyes; the nucleus (intestines, &c.) naked, unstalked, and pear-shaped.—Many species.

From the Mediterranean, Atlantic, and Pacific Oceans.

Family 2.—*ATLANTACEA.*

The body of the animal can be withdrawn entirely into the shell, which is spiral-formed; besides the fin there is a distinct foot; the comb-formed gills are situated under the mantle.

Atlanta. *Lesueur.* (Steira *Esch.*)—*Shell* compressed, somewhat resembling *Carinaria ;* having the apex spirally whorled, and a sharp keel; transparent, and large enough to contain the animal; operculum thin, horny, and spiral. *Animal,* the head distinct, more or less lengthened, having large eyes, and before them a pair of long tentacula; the mouth is proboscis-formed, more or less pliable; the foot has a compressed fin; and there is a prolongation behind, which bears a horny operculum.—2 species.

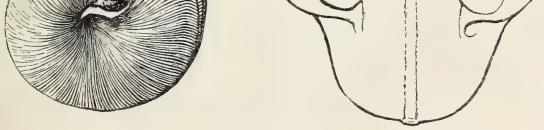
Atlanta.

The species *A. Peronii* is found in the seas of hot climates, and is a minute shell of great beauty.

Oxygyrus. *Benson.* (Ladas *Cantr.;* Helicophlegma *D'Orb.;* Brownia *D'Orb.*)—*Shell* wheel-shaped, rolled up, with encompassing whorls, very similar to *Bellerophon,* the next genus, which is only fossil. *Animal* differing from *Atlanta* in having, instead of tentacula, a naked fold of the skin.—2 species.

O. Keraudreni is found in the Atlantic and Mediterranean Sea, and is the best known.

Bellerophon. *Montf.*—*Shell* convolute, symmetrical, umbilicated, with a double dorsal ridge; aperture wide,



Bellerophon.

semilinear.* — Fossils, resembling *Nautilus*, but they are not chambered.

Bucania. *Hall.* — *Shell* having the whorls all rolled on the same plane, all visible, and the sides equally convex, the outer one globose, the inner angular, concave below; the mouth roundish oval, and the inner side somewhat compressed by means of the contraction of the next whorl, and the back and sides suddenly expanded. — Fossil.

Porcellia. *Léveillé.* — *Shell* orbicular, very much compressed, almost symmetrical; the spire very distinct, rolled on the same plane, with the exception of the first two or three whorls, which slightly project; a small but deep furrow on the back separates the whorls into two equal parts, and answers to a small, but pretty long notch in the outer lip; the umbilicus is very large, showing all the whorls; the aperture is oval, or almost five-cornered; the outer lip thin and sharp. — Fossil.

Family 3. — *PHYLLIRRHOACEA.*

The body entirely naked, compressed, with a tail fin, but no stomach or foot fin; no gills, and no shell.

Phyllirrhoe. *Peron.* (Euridice *Esch.*) — No *shell.*

Family 4. — *SAGITTACEA.*

The body is spindle-formed, with a tail fin, and several horizontal, or vertical fins, but no gills, and no shell.

Sagitta *Quoy* and *Gaimard;* Sagitella *Lesueur;* Timoriena and Monophora *Quoy* and *Gaim.;* Pterosoma *Lesson.*

* Sowerby's Conchological Manual.

Class III.—PTEROPODA.

The head of the animals of this class is more or less distinct, and at times is without eyes. (Gray falsely denies them eyes altogether.) Two, rarely four fins are situated between the head and the body, and are wing-like organs of locomotion, hence the name; sometimes a third lobe is found between both these, which is apparently to be regarded as a rudimentary foot like that of Gasteropoda. The body is elongated, oval, or globular, sometimes naked, sometimes enclosed in a shell of very varying nature.

Naturalists are not agreed as to the situation of these Mollusca in the system: Blainville and Souleyet include them with the Gasteropoda, and place them near *Bulla*, &c.; others place them with the Cephalopoda, on account of the suckers on the tentacula of *Pneumodermon* and *Spongiabranchia.*

The Pteropoda inhabit all seas, the Equatorial as well as the Polar: they belong to deep seas, seldom approaching the shores, and are nocturnal, or at least twilight Molluscs, not to be met with, therefore, in the sultry heat of the day; each species has its peculiar hour for appearing. The two fins are usually in constant and rapid motion; by their means the animal moves in a horizontal direction, rises or descends, while the body is kept in a perpendicular position, or slightly inclined; some species keep turning round in the same place, at the same elevation, without making any perceptible advance. On the appearance of any foreign body, or the violent shaking of the vessel that holds them, they lay the fins together, withdraw completely into the shell, and the animal sinks to the bottom. The *Cavolinia* swim faster than the *Clio;*

the *Pneumodermon* and *Clione* are the slowest. They appear, not only in calm weather, on the surface of the sea, but may be caught in myriads on a stormy night. An idea may be formed of their number when it is recollected that the *Clione borealis* forms the main aliment of the Greenland whale.

The food of the Pteropoda consists of other oceanic Molluscs which they can overpower, and small crustaceans; the larger species of *Clio* eat, for example, the young of *Atlanta; Clione borealis* devours the *Limacina arctica*, &c. The *Pneumodermon* seize their prey with their tentacula, armed with suckers. It is singular that no observer has yet found any individuals with eggs, nor any young among them.

Mr. Forbes thus opens his article on Pteropoda:—"In warmer seas than those which encircle our islands, the surface of the water, when the weather is calm, and the sun is shining, glistens with glassy needles, or shelly bubbles. These upon closer examination prove to belong to curious Molluscs, which, instead of creeping over submarine rocks and weeds, or burying themselves in the soft mud and sand of the sea-bed, aspire to a gayer and more sportive life, and play the part of Neptune's bees and butterflies. From our less congenial waves they are almost altogether absent, only a few stragglers, and those with one exception of microscopic dimensions, have met even the scrutinising eyes of practised naturalists."

As the shell is sometimes present, sometimes absent, the Pteropoda may be divided into two orders: Thecosomata, with a shell, and Gymnosomata, without one.

Order I.

THECOSOMATA.

The body of the animal is most generally enclosed in a shell; the head not distinct; the fins, a single pair; no outward gills.

Family 1. — *CAVOLINIACEA.*

Animal with the body large, perfectly symmetrical, with the gills in pairs. *Shell* calcareous, symmetrical, elongate or globular, and possessing no operculum.

Cavolinia. *Gioeni.* (Tricla *Retzius.* Hyalæa *Lam.* Archonta *Montf.*). — *Shell* horny or glassy, transparent, ovate, globular, tridentated posteriorly, open at the summit and at the two posterior sides.

Hyalæa trispinosa.

Animal, with a globular body having two wing-like lateral expansions, which are projected from the slits at the sides of the shell, and a broad expanded two-winged natatory disk extending on each side of the anterior extremity; head not distinct; branchiæ lodged in a special cavity; no operculum.* — About 20 species; also fossil.

These curious little shells are found in the Mediterranean and Atlantic. *C. trispinosa* has for its trivial name in England that of Venus' Chariot.

Clio. *Lin.* (Cleodora *Péron* and *Lesueur*). — *Shell* cartilaginous, transparent, in the shape of a reversed pyramid, truncated, and open at the summit. *Animal,* lengthened, without side appendages to the mantle; two distinct tentacula; the under apron-formed prolongation of the fin (or

Clio.

* Forbes's British Moll.

float) is two-lobed, which makes the transition to the distinct foot-formed appendage of Cuvier; the mouth has a formidable apparatus for seizing prey, and the tongue is armed with recurved hooks. — 5 species.

The Indian and Atlantic Oceans produce these curiously delicate little shells; many of them have the appearance of the finest and thinnest glass. D'Orbigny says they appear in myriads on the surface of the sea, about twilight on calm nights, and that they disappear about day-break. "An interesting fact noticed by Mr. F. Debell Bennett, is that the *C. cuspidata*, which is found floating in great numbers on the surface of the sea in various parts of the Pacific Ocean, exhibits a speck of delicate blue light shining through the apex of its extremely thin shell."*

Balantium. *Leach.* — *Shell* triangular, depressed, transversely waved, aperture oblong, narrow and oblique. *Animal* not essentially different from Clio. — 4 species.

From the seas of Guinea.

Vaginella. *Daudin.* (Vaginula *Sow.*). — *Shell* oblong, ventricose, smooth; apex conical; aperure contracted, transverse, without any lateral slit. — Fossil, 1 species (Gray).

Creseis. *Rang.* — *Shell* thin, fragile, transparent, pyramidal, pointed, a dorsal ridge produced into a point at the edge of the aperture.† — 6 species, also fossil.

Creseis Spinifera.

C. Spinifera, so called from its resemblance to a thorn, is found in the Mediterranean.

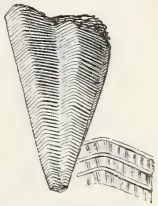
Theca. *Sharpe.* — *Shell* "sheath-shaped, with a triangular opening, flat, or slightly rounded posteriorly, rounded or angular in front, marked with numerous lines of growth." — 2 species, fossil.

* Pro. Zool. Society, 1837.

† Sow., Conch. Manual.

The shell exactly resembles a scissor-sheath.

CONULARIA. *Miller.* — *Shell* conical; straight or nearly so; divided into chambers by imperforate septa; aperture half closed; apex solid, obtuse; external surface finely striated. — 15 species fossil (Gray).



Conularia.

Resembling Orthoceras, but wanting the siphon.*

COLEOPRION. *Sanberger.* — *Shell* tubular, gradually pointed, surrounded by oblique rings of growth, alternately grasping each other, open lengthwise; the inner surface of the tube is smooth. — 1 species, fossil.

PUGIUNCULUS. *Barrande.* — *Shell* pyramidal, elongated; a section forms a nearly equilateral triangle, the sides bulging, and the apex blunt; the aperture with a slightly curved border, more or less oblique to the axis of the length. — Fossil.

TRIPTERA. *Quoy* and *Gaim.* (Cuviera *Rang.*) — *Shell* cylindrical, ending in an acute point; rather angular near the aperture; separated from the anterior cavity by an entire transverse septum; the tip often falls off. *Animal* body elongate; two large lateral wings, and between them a lobe. — 3 species; also fossil.

Found on the coasts of Brazil, Australia, and India.

Family 2. — *CYMBULIACEA.*

Animal globular or ovate; fins two, one on each side of the mouth with a small intermediate lobe. *Shell* cartilaginous, slipper shaped, occasionally wanting.

* Sow, Conch. Manual.

CYMBULIA. *Péron* and *Lesueur.* — *Shell* cartilaginous, very transparent, crystalline, oblong, in the shape of a shoe, truncated at the summit; aperture lateral. *Animal,* body oblong, transparent, enclosed in the shell; head having two eyes and two retractile tentacula, fins large with a three-pointed body between. — 5 species, recent.

Cymbulia Peronii.

This singular shell is as transparent as glass, and the form most beautiful, as is shown by the figure above, of *C. Peronii.* Sowerby says this beautiful object can hardly be called a shell, for it is in no wise testaceous; he calls it a boat-shaped integument of a transparent horny substance. It is occasionally thrown on the shore at Nice, in the Mediterranean, and in the Indian sea.

EURYBIA. *Rang.* — *Shell* cartilaginous, membranaceous, thin, transparent, shaped like a hood; aperture round and spread out. *Animal* globular; having two wings on each side of the mouth; the intermediate lobe very small, and of a triangular form. — 2 species.

Found in the Atlantic.

PSYCHE. *Rang.* — *Shell* none, or very thin, and membranous. *Animal,* body free, membranous, without any distinct head; tentacula none; wings two, elongate without any intermediate lobe. — 1 species.

P. Globulosa is found on the Newfoundland coast.

TIEDEMANNIA. *Delle chiage.* — *Shell* none. *Animal,* body gelatinous, transparent; neck elongated; tentacula two; wings very large, wedge-shaped. — 1 species.

T. Neapolitana is found in the Mediterranean.

Family 3.—*LIMACINACEA.*

The body of these animals is spiral, contained in a shell, and having two fins without lobes between them. The shell is spirally whorled; thin, transparent, and perfectly smooth; the aperture on the columella side is drawn forward into an angle. An operculum is present.

Limacina.

Limacina. *Cuvier.* (Spiratella *Blain.*; Heterofusus *Flem.*; Helicophora *Gray*; Spirialis *Eydoux* and *Souleyet*; Atlanta *D'Orb.*, part.; Peracle *Forbes*; Scaea *Ph.*; Campylonaus *Benson*; Heliconoides *D'Orb.*)—*Shell* thin, fragile, papyraceous, spiral; the whorls discoid or elevated, umbilicated on each side, and carinated on the back; aperture large and entire, or angulated below. *Animal*, elongated, spiral; head not distinct; two fin-like expansions united at their base by an intermediate lobe*, bearing an operculum; branchia in a cavity formed by the mantle; operculum vitreous, very thin and transparent, of few whorls.†—12 species.

This curious little mollusc can retire completely into its shell. It inhabits the Mediterranean, the Northern, and Indian Seas, and is said to be devoured in vast quantities by whales; according to Mr. Scoresby it is found in great profusion near Spitzbergen. These little glassy shells are, some of them, like a minute *Argonauta*, and others are sinistral and turret formed. L. (Spirialis) *Flemingii* is found on our north coasts, but it is not larger than an ordinary pin's head. L. *Macandrei* and *Jeffreysii*, are also very minute.

* This Philippi calls a rudimentary foot.

† Forbes's British Moll.

Order II.

GYMNOSOMATA.

The body of the animals of this order are naked, without shell. The head is distinct; the fins are two, rarely four; the gills, when present, external.

As they possess no trace of a shell, the generic names alone will be given.

Family 1.—*CLIONACEA.*

Clione *Pallas;* Cliodita *Quoy* and *Gaim.;* Pelagia *Quoy* and *Gaim.*

Family 2.—*PNEUMODERMACEA.*

Pneumodermon *Cuvier;* Spongiobranchæa *D'Orb.;* Trichocyclus *Esch.*

Family 3.—*CYMODOCEACEA.*

Cymodocea *D'Orb.*

Class IV.—CONCHIFERA.

The animals of this class have the body enclosed in a mantle of two lobes (as a book lies between its covers), but on its under side the edges of the lobes are not always free, but often more or less united. This mantle possesses the property of elaborating lime granules on its outer surface, which gradually become organised into two shells or

valves; it is very contractile, and along its free edges is often studded with sensitive tentacles also contractile; on the inner surface it is covered with a shining epithelium or internal epidermis. The shells of the conchifera consist for the most part of two distinct layers; the outer one is formed of prismatic cells*, which stand perpendicularly to the surface of the mantle, and are filled with carbonate of lime; the inner one is without cellular structure, and consists of numerous scales or laminæ lying one above the other, among which granules of lime are deposited. Sometimes the outer, sometimes the inner predominates in the substance of the shell. Both retain their distinctive appearance in the fossil; the inner, by its laminated nature, and larger portion of animal matter, showing its structure most clearly, and the external one being often changed into spar, or disappearing altogether; indeed, a shell containing a large proportion of animal membrane, often

* Dr. Carpenter has the following observations on this structure, in a paper read to the Geological Section of the British Association in 1843. Speaking of the membranous basis of bivalves after the calcareous portion is removed by acids, he says:—"This consists of a stratum of *prismatic cells* adherent together at their sides, and forming by their extremities the two surfaces of the membrane, which thus presents the appearance of a honey-comb. This is most characteristically seen in *Pinna*, nearly the whole of which shell is formed of this *prismatic* cellular substance, as may be easily shown by examining the thin laminæ into which it separates, without any preparation, by the aid of even an ordinary microscope. These cells are usually hexagonal in form, but are not very regularly so. Their size varies considerably, both as to diameter and length, even in the same shell. When very long, the layer which they form will possess considerable thickness; when they are very short, it will be delicately thin." This structure is observable in the following genera:—Pinna, Avicula (Meleagrina) Perna, Malleus, Crenatula, Ostrea, Etheria, Unio, Anodon, and Pandora. In fossil specimens of the above genera the prismatic structure is well preserved.

becomes an entire mass of flint. Both valves are attached to the animal inhabiting them on their inner surface, merely by the insertion of muscles, and all along their outer edge by a skin, which is organically connected with the border of the mantle. This skin or epidermis covers the outer surface of the valves, and sometimes terminates in hairs or silky filaments, for example, amongst the conchifera, in the genus *Arca* and *Pectunculus;* its texture is horny, and in the *Mya* and *Lutraria* it encloses the siphons also.

The valves are fastened together by means of an indian-rubber like band or ligament, which, by its elasticity, both holds them asunder, and acts as an antagonistic force to the muscles which close them, and this whether it be situated on the outside or inside the valves. Where the ligament connects these two valves, these latter often possess besides, tooth-like processes, which lock into each other; hence this connection of the valves by means of the ligament and teeth is called the hinge. The valves are closed by means of one or two specific muscles, the impression of which can be readily seen on the inside of the shell.

As an organ of locomotion, the conchifera use the so-called foot, an extremely muscular appendage issuing from the animal in an oblique direction, and having the power of extension. It is of various forms; sometimes compressed at the sides, and resembling a tongue, or it is like a hook, or hatchet, or worm; and its adaptations are as various as its form, serving the animal for creeping, springing, and boring into sand. In many stationary species the foot is rudimentary or wanting; in others there is found at its base a glandular organ, which forms separate horny filaments, called the beard or byssus, by means of which the animal attaches itself to wood, stones, or the shells of other mollusca. In these the foot is usually attenuated an

vermiform; it can be protruded or withdrawn, and in solitary cases may be used for creeping. The byssus is much diversified; in the *Arca* it is a single compact body; in the *Pinna* it consists of threads separate in their whole length, and so fine as to be manufactured into cloth called Lama marina.

The mouth is situated near the back of the animal, within the cavity of the mantle; it has no jaws, but is provided on each side with two, lobed, often sickle-shaped tentacles, which frequently in their structure look like gills. The œsophagus is short, leading into a crop-like distension, but it is not otherwise separated from the intestinal canal. Many conchifera have a kind of blind sac rising near the pylorus, which through its whole length contains a cartilaginous, glassy cylindrical body, the so-called "crystalline stylet." This is a kind of gizzard for triturating the food.

Their nutriment, consisting of slime and small organised bodies, is taken up with a portion of water into the cavity of the mantle, and by means of the shining epithelium or horny lining of the mantle, is directed towards the mouth, assisted by the before-mentioned lip tentacles.

All conchifera have a large liver, which occupies a considerable portion of the back, also a well developed heart, with colourless blood. There are usually two pair of gills, which enfold the body on either side like two leaves, and have a network of canals, along which the blood streams. In the *Arca*, *Pectunculus*, *Pecten*, and *Spondylus*, the gills are broken up into a multitude of ribbon-like filaments, lying in rows close to one another, and in the *Solenomya* they look like down. The water reaches them through the mantle slit, or, where this is closed up, through a particular aperture, and is afterwards discharged. For the latter purpose the mantle, when it is not slit, has at

the side one or two openings, or even tubes; one is the anal aperture, the under one the breathing tube. The presence of such tubes is indicated by a sinus impressed by the mantle upon the inner surface of the valves; the larger this sinus is, the longer have these tubes been.

The main mass of the nervous system consists of three pairs of ganglia; these are connected by cords of communication, and send off nerves to each organ of the body. The tentacles, which stud the edges of the mantle, fulfil the office of feelers, as do also the before-mentioned mouth feelers. The organs of hearing are simply two round capsules, filled with a clear humour, and containing a polished bullet-shaped body formed of carbonate of lime.

Eyes are found in many conchifera; these are always situated on the edge of the mantle, or on the outer side of the mantle tubes, differing in number, and in being pedunculated or not; they are very completely organised. The most striking are the beautiful emerald eyes of the *Pecten*, situated between the tentacles.*

These Molluscs live in water, both salt and fresh, and occur in every zone. Some live altogether concealed from sight in sand and mud, and they only betray their locality by a little hollow, out of which they now and then spirt up the water. Some are completely visible, fixed to one spot, as oysters, or attached by their byssus, as mussels. Some lie ensconced in holes of rocks, corals, the thickness of other shells, or in wood, and many of them possess a remarkable aptitude in boring for themselves such receptacles. In the *Pholas* and *Teredo*, little flinty particles are imbedded in the fore-part of the

* These eyes disappear, some writers assert, as the mollusc grows older; but there are many rudimentary organs of sight on the border of the mantle.

body, which protruding through the skin, give it the appearance and property of a rasp, which adapts it to rasp away soft materials, like chalk and sandstone. In the *Saxicava rugosa* this flinty rasp occupies the whole of the fore-part of the mantle. When the little mollusk steadies itself with its foot in a hollow, or attaches itself by its byssus, it obtains all the support requisite, while it works away upon the hard material. Some authors affirm that these Molluscs prepare their cells chemically, by dissolving the carbonate of lime, by means of some acid, either carbonic, acetic, or lactic acid.

A remarkable quality which some of these animals possess, here deserves notice, on account of the importance to mankind of its products. In the flesh of some kinds there are often found concretions of carbonate of lime, which assume very regular forms and smooth surfaces; and in those species that show a mother-of-pearl lining to their shells, these little bodies have the same beautiful appearance; in fact they are the pearls which fetch so high a price as ornaments. There are two genera from which this costly product is obtained; the sea pearl mussel (*Avicula margaritifera*), which yields the so-called oriental pearls, and the fresh-water pearl mussel (*Margaritana* (*unio*) *margaritifera*), in which pearls are found, but they are by no means so much prized as the first.

As food both for man and animals, the conchifera are of far greater importance than all the other tribes of molluscs, and the number of individuals belonging to each kind is also commonly much greater.

Touching the systematic arrangement of this class, the views of naturalists are, if possible, more various than in the distribution of the rest of the Mollusca. Most writers divide them into those having one closing muscle (*Monomy-*

aria) and those having two (*Dimyaria*). In this distribution all regard to their powers of locomotion is lost sight of, and an arrangement of the families according to their degrees of perfection becomes impossible.

Notwithstanding the above remark, the Conchifera are still arranged by the two well known orders of *Dimyaria* (or those having two fastening or adductor muscles) and *Monomyaria* with only one, Philippi adding another between the two, *Heteromyaria*, including those still having two muscular impressions, but which are at unequal distances from the edge.

Order I.

DIMYARIA.

The animals of this order have two nearly equal adductor or fastening muscles; the shells therefore have two muscular impressions in each valve, which are generally distinctly visible.

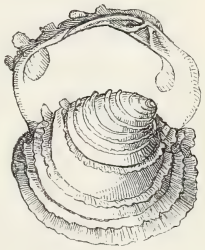
Family 1. — *TELLINACEA.*

The animal has the two lobes of the mantle separated (where the valves open) in their entire length, and prolonged behind into two either long or short tubes; the foot is compressed, generally tongue-shaped, never producing a byssus; the gills are four, and leaf-shaped. The shell is tolerably equivalve, the hinge has several cardinal, and sometimes lateral teeth. The marine genera are

usually found on sandy shores, in most seas; the rest are fluviatile.

(Marine genera, with the ligament external.)

VENUS. *Lin.* — *Shell* regular, closed, equivalve, mostly somewhat inequilateral, varying from oval to triangular; in one valve three or four cardinal teeth, in the other three teeth which diverge, no lateral teeth, ligament external; the pallial impression has generally a sinus behind. *Animal*, with the mantle cloven in its entire length: the siphons either connected or separated: foot either compressed, broad, small, or hatchet-shaped; gills normal. —Many species; also fossil.



Venus thiara.

This genus, which is one of the most beautiful and numerous amongst the *Dimyaria*, is found in all parts of the world. The species *V. Mercenaria*, commonly in America called the *Clam*, is cut by the North American Indians into beads, of which they construct their wampum or treaty belts; the shells are also used amongst them as money, and are made into ornaments for their dresses. *V. thiara* (figured above) is very remarkable for the thin laminæ placed at regular distances on both valves, and is a very pretty and delicate shell. The animals of most species serve as food for man; they lie buried in the sand, at a short distance from the shore, and are most abundant in hot climates. There are several British species.

Philippi remarks that the animals and shells of this genus present many essential differences; he does not approve of the divisions made by Lamarck, into *Venus* with three cardinal teeth, and *Cytheria* with four, but he thinks others must unquestionably be made when they are more known.

Gray has formed twelve genera, but they are not characterised; the names are as follows: — Dosinia, Meretrix, Cuneus, Trigona, Dione, Circe, Venus, Mercenaria, Anomalocardia, Chione, Tapes, Clementia.

ARTEMIS *Poli.* — *Shell* more or less orbicular, equivalve, inequilateral, concentrically striated, or ridged, rarely smooth, ridges sometimes laminated at the sides, especially at the posterior side; area of the ligament sometimes simple, generally more or less excavated, anterior side mostly impressly lunulated; hinge strong, with three diverging teeth in one valve, and four in the other; ligament sub-external, muscular impressions oblong, nearly equal, impressions of the sinus of the mantle conspicuously lanceolately triangular, rather deep; shell mostly whitish.* *Animal,* suborbicular, its mantle freely open, the margins entire, or only partially serrated; siphonal tubes long, united to their extremities, margins of their orifices fimbriated: foot semilunar.† — 61 species‡; also fossil.

Artemis lucta.

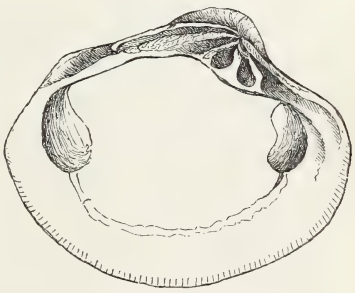
Mr. Reeve remarks that the shells of this genus rarely present the polished smoothness or colouring of *Cytheria* (of Lamarck), nor the festooned sculpture so frequent in *Venus;* but are generally concentrically striated or ridged. Three species inhabit the shores of Europe, five those of China, Japan, and Korea; eleven are from the Philippines, two from the Malaccas, seven from Australia, two from New Zealand, six from North Africa, and seven from America. *A. ponderosa* is the largest and most striking.

TETHIS. *Sow.* — *Shell* equivalve, subequilateral, more

* Reeve's Iconica. † Forbes's British Moll. ‡ Iconica.

or less orbicular, and convex; ligament marginal, three or four small acuminated teeth about the hinge: the line of attachment of the mantle has a deep sinus extending nearly to the beak; muscular impressions rounded, small, distant from the hinge, ligament external.* — (Fossil.)

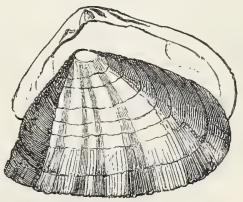
CYPRINA. *Lam.* — *Shell* rather orbicular, equivalve, inequilateral, obliquely heart-shaped, covered with a thick brown epidermis; ligament large external, three cardinal teeth, and generally one lateral tooth in each valve; bosses turned on one side, no lunule, and no sinus in the pallial impression. *Animal,* suborbicular; the mantle freely open with plain or serrated edges: siphonal orifices sessile or nearly so, their margins fringed, the branchial the largest; foot large, linguiform; labial palpi moderately long, triangular.† —1 species; also fossil.



Cyprina Islandica.

C. Islandica, which is found in the Northern Seas, and on our own shores, often attains a large size, and is covered with a brown epidermis.

DONAX. *Lin.* — *Shell,* equivalve, inequilateral, transverse, wedge-shaped, cardinal teeth two on one or both valves, lateral, variable, ligament on the shortest side, which is often very much flattened and truncated; valves more or less crenulated at the margin; the pallial sinus wide and deep: an epidermis. *Animal* oblong, its mantle



Donax.

* Sow., Conch. Manual.

† Forbes's British Moll.

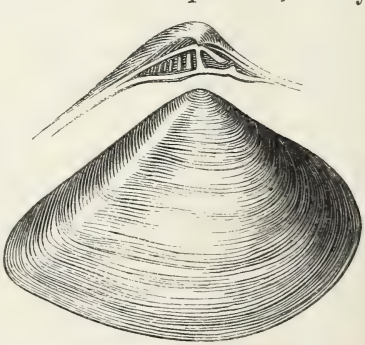
freely open in front, with fringed or partially fringed margins; siphons separated to their bases, the branchial with pinnated cirrhi round the orifice, the anal with simple denticulations; foot very large, apiculated, sharp edged; branchial laminæ on each side distinctly separated: labial palpi long and triangular.* — 40 species; also fossil.

The species are found in all parts of the world buried in the sand of the shore; many of them very beautiful, though few have any striking colours; they have a horny, light coloured epidermis. Several are natives of our shores.

Amphichœna. *Philippi.* — *Shell* elongated, almost lineal, nearly equilateral, gaping on both sides; bosses small; hinge with two teeth in one valve, and three in the other, no lateral teeth; ligament external, on scarcely meeting hinge plates; two muscular impressions, and a deep mantle sinus. *Animal* unknown. — 1 species.

The species *A. Kindermanni* from Mazatlan, appears to be a form between *Donax* and *Solen.*

Grateloupia. *Desmoulins.* — *Shell* equivalve, nearly equilateral, sub-cuneiform, rounded anteriorly; subrostrated posteriorly; hinge, with three cardinal teeth, a series of five or six irregular small diverging teeth behind the umbones, and one lateral anterior tooth in each valve; ligament external; muscular impres-



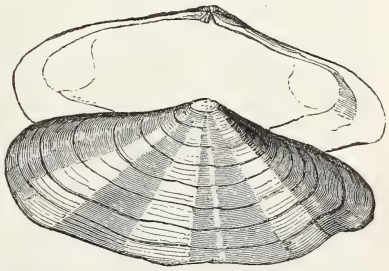
Grateloupia Moulinsii.

* Forbes's British Moll.

sions two; pallial impression sinuated posteriorily.* fossil.

There is 1 species *G. Donaciformis.*

TELLINA. *Lin.* — *Shell* nearly equivalve, rather inequilateral, transverse, or orbicular, and greatly compressed; the valves on the ligamental side irregularly undulated; cardinal and lateral teeth two, the latter sometimes wanting; ligament external, and on the shortest side: pallial impression with a deep and wide sinus. *Animal*, ovate, compressed; mantle entirely open in front, its margin fimbriated; siphons long, separate throughout, usually nearly equal, their orifices plain or very indistinctly toothed; foot large, triangular, compressed, apiculate; labial palpi large, lanceolate; branchial leaflets, united in pairs on each side.† — 207 species‡; also fossil.



Tellina radiata.

The *Tellinas* are all attractive from their beautiful colour and elegant form. The valves are not always similar, one being occasionally more convex than the other, the colours and bands also differing, and the valves in some species are much more twisted than in others. The animal has the power of springing to a considerable distance, by folding a portion of its body, and then suddenly extending it; the shell being closed at the same time with a loud snap. They bore into the sand on the sea-shore, and often become the prey of carnivorous shell-fish as the *Buccinum.*

* Sow. Conch. Manual. † Forbes's British Moll.

‡ Sow. Thesaurus.

They are found in all parts of the world; ten of the species are natives of the British shores.

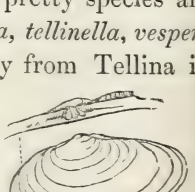
Psammobia. *Lam.* (Gari *Schum.*) — *Shell* transverse, oval, equivalve, rather inequilateral, and slightly gaping at each end; surface smooth or striated; hinge having two teeth in one valve, and one in the other; ligament prominent; epidermis thin.

Psammobia.

Animal, oblong and compressed; mantle open throughout its length, and bordered by a fringe of fine simple filaments; the siphons are very long, slender, and delicate, marked with longitudinal ciliated lines, which terminate in more or less conspicuous cirrhi, few in number, surrounding their orifices; foot rather large and linguiform; the labial tentacles are triangular and internally pectinated; one of the branchial leaflets on each side is shorter than the other. * — 24 species; also fossil.

This genus presents a good deal of beauty in some of its species, the shells being often ornamented with lively colours. The animals live in sand or gravelly mud, and are found in the Indian Ocean, the shores of New Holland, the North Sea, and four or five very pretty species are found on the British shores as *P. costulata*, *tellinella*, *vespertina*, and *ferroensis*. They differ chiefly from Tellina in having their ends more gaping.

Sanguinolaria. *Lam.* — *Shell* transverse, equivalve, inequilateral, slightly gaping at both ends; hinge having in each valve two teeth approaching each other, no lateral teeth;



Sanguinolaria rosea.

* Forbes's British Moll.

a deep sinus in the pallial impression. *Animal* unknown. — Few species; also fossil.

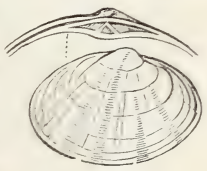
From Jamaica, New Holland, the Indian and American seas.

Capsa. *Brug.* (Capsa *Lam.*; Capsula *Schum.*; Sanguinolaria *Desh.*) — *Shell* oval, globose, both ends gaping, equivalve, but rather inequilateral; ribbed in rays; ligament exterior, and on the shortest side; two cardinal teeth in each valve, none lateral; margins not crenulated; pallial impression with a deep sinus. *Animal* unknown. — 2 species.

India and Brazil produce these shells, which lie buried at small depths in the sand, one species is the *Venus deflorata* of Linnæus.

(Marine genera, with the ligament internal.)

Mactra. *Lin.* — *Shell* mostly thin, oval, transverse, with thin cardinal and lateral teeth, one of which, shaped like the letter V, has the point near the boss locking into a pit in the other valve; cartilage pit triangular; valves slightly inequilateral, and gaping a little on each side; bosses protuberant. *Animal* triangular or oblong; its mantle freely open in front as far as the siphons; the margin more or less distinctly fringed; the siphons are united to their extremities, which are surrounded with fringes of simple cirrhi; the foot is strong, changeable in shape, linguiform, and geniculate; the labial tentacles are long, pointed, and pectinated on their inner sides; the outermost branchial leaflets in each pair is shorter than the other. * — More than 50 species; also fossil.



Mactra stultorum.

The *Mactra* live in the sand, and are found in all parts

* Forbes's British Moll.

of the world; the genus includes many rare and beautiful foreign species, of various forms, besides several British.

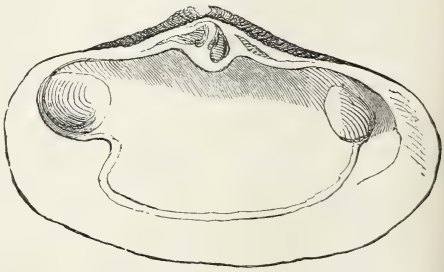
Philippi has Schizodesma, Spisula and Mulinia of Gray, as subgenera.

CARDILIA. *Deshayes.* — *Shell* oblong, longitudinally heart-shaped; ventricose, with prominent bosses; hinge with a small cardinal tooth, and a pit at the side; a spoon-shaped projection receives the ligament, which is internal. *Animal* unknown.

Cardilia.

Deshayes formed this genus for *Isocardia Semisulcata* and a small fossil shell. The recent species is found on the north coast of New Holland, and the Straits of Malacca.

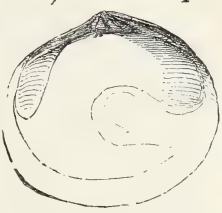
DONACILLA. *Lam.* (Mesodesma *Desh.*) — *Shell* thick, ovate, transverse or triangular, equivalve, rather compressed and generally closed; the hinge has two thick lateral teeth in each valve, and between these is situated a deep spoon-shaped cavity for the ligament; the mantle impression has a sinus more or less deep. *Animal* having the lobes of the mantle connected two thirds of their length, and prolonged behind into two short tubes; the foot compressed; the gills short, united behind, the outer pair smaller than the inner pair. — 10 species; also fossil.



Donacilla.

The type is *D.* (Amphidesma) *donacilla.* Lam.

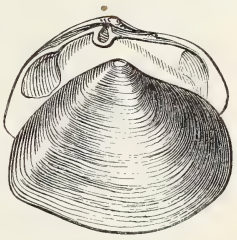
Semele. *Schum.* (Amphidesma Lam.) — *Shell* equivalve, round or rather oblong, inequilateral, and closed, with a slight wave or fold like that of *Tellina*; two small cardinal teeth and a long narrow pit between; large lateral teeth; ligament both external and internal, and without a special hinge plate; mantle sinus round and deep. *Animal* unknown. — Many species; also fossil.



Semele.

These shells are found in the sand on the sea-coasts of tropical countries; and also those of England and Holland. They have, many of them, transverse stripes, and usually, moreover, fine stripes radiating from the bosses.

Cumingia. *Sow.* — *Shell* equivalve, inequilateral, transverse, rounded anteriorily, subrostrated posteriorily; hinge with a central spoon-shaped cavity in each valve, containing the cartilage; a very small anterior cardinal tooth in each valve; two lateral teeth in one valve, none in the other; muscular impressions two in each valve, distant, pallial with a very large posterior sinus.* *Animal* unknown. — About 6 species; also fossil.



Cumingia mutica.

Found in sand in the American seas and in the tropics.

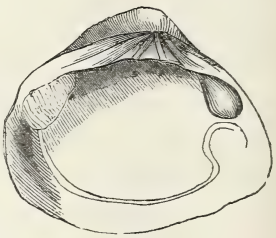
Scrobicularia. *Schum.* (Lavignon *Cuvier*; Arenaria *Muhlf.*; Listera *Turton.*) — *Shell* with no lateral teeth, but with one or two small cardinal teeth, and the internal cartilage placed in an oblique spathula fulcrum in each valve; pallial sinus ample; ligament small, narrow, par-

* Sow., Conch. Manual.

tially external; the shell compressed, rather equivalve, dull, and nearly smooth. *Animal* compressed, oblong, or suborbicular; mantle open, its margins distinctly denticulated; siphonal tubes long, separated throughout, their orifices plain; foot large, linguiform, compressed; labial palpi large and triangular. — Few species; also fossil.

Some species from the Mediterranean, and one on our own coasts, the *Mactra piperata* of Gmelin.

Erycina. *Lam.* (Syndosmya *Recluz;* Abra *Leach.*) — *Shell* transverse, sub-inequilateral, equivalve, rarely gaping; two unequal cardinal teeth diverging, having a pit between them; two oblong, compressed, short lateral teeth; ligament internal, placed in a triangular hollow; pallial impression deeply sinuated. *Animal* scarcely to be distinguished from Tellina; the mantle is widely cloven and lengthened into two separate siphons, of which the upper one is the shorter; the foot is long and compressed. — Several species; also fossil.



Erycina.

The species are found on the European coasts; Forbes illustrates four species as British under the generic name of Syndosmya, and one comes from New Holland. *E. Boysii, tenuis, prismatica,* &c., were arranged by Lamarck in the genus Amphidesma.

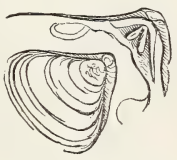
Embla. *Lovén.* — *Shell* equivalve, gaping behind, truncated; ligament lying internally in a hollow of each valve, behind which, in the right valve, is a hinge tooth, whilst the left valve also presents a corresponding hollow; the latter has two lateral teeth; the right a hollow, but no lateral teeth; a broad, doubled, pallial impression, with

scarcely a sinus behind. *Animal*, with an open mantle, long cirrhi behind, and two siphons.—1 species.

A solitary imperfect specimen has been brought from the North Sea.

(Fluviatile genera, with the ligament external.)

GALATEA. *Brug.* (Egeria *Roissy;* Megadesma *Bowdich;* Potamophila *Sow.*) — *Shell* equivalve, thick, solid, and closed, somewhat triangular, nearly equilateral, epidermis greenish and horny; cardinal teeth two in one valve, and three in the other, lateral teeth very indistinct; ligament external, projecting and swollen; the pallial impression has a sinus behind. *Animal* with generally an open mantle, the hinder part running out into two straight, divided siphons; the foot is large, rather long, compressed; on each side are two unequal gills, the outer of which is joined to the middle of the upper edge of the inner gill; which is an unusual formation; the mouth is large, the four mouth tentacles triangular.—6 or 7 species.



Galatea radiata.

The species are found in the rivers of Africa, and are rare shells; *G. radiata* the most common.

CYRENA. *Lam.* — *Shell* thick, inequilateral, and round in form; cardinal teeth three in each valve, lateral generally one; ligament external, and on the longest side; bosses eroded; an epidermis. *Animal* very similar to the Cyclas.—20 species recent; also fossil.

Cyrena fluminea.

Natives of rivers in warm climates, particularly in Asia: the shell has the interior of a beautiful violet colour, the outside being occasionally tinged with the same.

VILLORITA. *Gray.* — *Shell* (according to a figure by Gray without description) thick, triangular, closed, provided with a strong epidermis; and having especially strong hinge teeth, lateral teeth wanting; ligament external. *Animal* unknown. — 1 species.

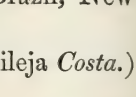
The only known species is *V. cyprinoides*, which is not to be confounded with *Cyrena cyprinoides* of Quoy. The locality from which it is brought appears to be unknown.

CYCLAS. *Brug.* (Cornea *Muhlf.*; Sphærium *Gray.*) — *Shell* thin, roundish, or transverse, equivalve, and inequilateral; two small cardinal teeth in each valve, one of which is folded in two, but rather uncertain, lateral teeth lengthened transversely, and compressed; ligament exterior; an epidermis. *Animal* suborbicular, its mantle freely open in front, and anteally united posteriorily to form a produced siphon, divided at its extremity into two nearly equal tubes, which, as well as the margins of the mantle, are not fringed; foot large, linguiform, very extensile; labial palpi long, and lanceolate.* — Several species; also fossil.

Cyclas rivicola.

The shells of this genus are not larger than a nut; some of the species are very thin and transparent, and have projecting, not eroded bosses. They inhabit rivers in various parts of Europe, North America, Brazil, New Holland, and there are four British species.

PISIDIUM. *Pfeiffer.* (Pisum *Megerle*; Galileja *Costa.*) — *Shell* equivalve, thin, usually tumid, suboval, inequilateral, smooth, or concentrically striated; hinge with one tooth in the right, and usually two in the left valve; also lateral teeth; ligament external, inserted at the shortest side. *Animal* suboval, with the



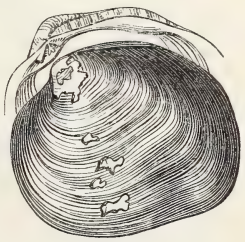
Pisidium nitidum.

* Forbes's British Moll.

mantle freely open in front, and anteriorily; posteriorily united to form a single siphon, composed of the united anal and branchial tubes; margins of its orifice, and of the mantle simple; foot large, linguiform, and very extensile.*— Several species; also fossil.

There are seven British species, all small, living in lakes, ponds, ditches, and springs. Mr. Gray says that they have the power of gliding along the surface of the water, with their foot extended on it, and the shell immersed, and in an inverted position. In this manner, like the *Limnæi* and other Gasteropods, they contrive to traverse the vessel from side to side, as though they were crawling along a solid plane.†

CYRENOIDA. *De Joannis.* (Cyrenella *Desh.*)— *Shell* equivalve, sub-equilateral, ventricose, thin, covered with a reddish brown epidermis, corroded at the umbones, and with a slight posterior fold; hinge thin, with three diverging cardinal teeth in each valve, and a very slight posterior fold in the right valve; ligament not very tumid. ‡ *Animal* with a widely cleft, entire bordered mantle, two siphons connected together half the length of the shell; foot cylindrical, blunt, rather large; two striated gills; four lancet-shaped striated lip tentacles.



Cyrenoidea Dupontia.

A fresh water shell slightly differing from *Cyclas* and *Cyrena*.

IPHIGENIA. *Schum.* (Capsa *Lam.*)— *Shell* equivalve,

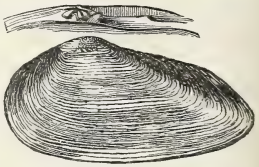
* Forbes's British Moll. † Land and Freshwater Shells.
‡ Sow., Conch. Manual.

closed, triangular, nearly equilateral, covered with a strong epidermis; the hinge in the right valve has two teeth, in the left a single one doubly cleft, which interlocks with them; no lateral teeth; ligament external; mantle impression with a sinus. *Animal* unknown. — 3 species.

Iphigenia braziliensis.

Two species are known from Brazil and Central America, as well as one from Senegal; all are supposed to be found in fresh water, and if this is certain, Philippi remarks, the genus must be retained.

GLAUCONOME. *Gray.—Shell* oval, thin, equivalve, slightly ventricose, inequilateral, rounded anteriorily, more or less attenuated posteriorily, covered with a thin epidermis which sometimes extends beyond the margin; hinge, three teeth in each valve, no lateral teeth; ligament external. *Animal* unknown. — 9 species.*



Glauconome chinensis.

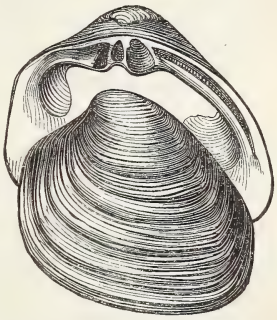
Reeve says that these shells are found in brackish water, at the mouths of rivers in the Philippines, the Ganges, &c. They are distinguished by their thin light-green horny epidermis.

(Fluviatile genus, with the ligament internal.)

GNATHODON. (Rangia *Des Moulins;* Clathrodon *Cour.*) — *Shell* nearly oval, equivalve, inequilateral, and covered with an olive-green epidermis, generally a little decorticated at the umbones; one lateral and two cardinal teeth

* Reeve's Iconica.

in one valve, shutting between two cardinal and two lateral teeth in the other; ligament internal, inserted in a deep pit situated between the cardinal and posterior lateral teeth; the impression of the mantle exhibits a small sinus.* *Animal* with the mantle divided from one to two thirds of its length; two short approaching siphons partly united; foot compressed, oblique, nearly four cornered or hatchet shaped; gills like those of *Galatea*, namely the outer one fastened by its centre to the upper edge of the inner one, so that it looks as if there were three gills on each side; the lip tentacles are large, triangular, elongated, very pointed; mouth small. —2 species.



Gnathodon cuneatus.

One species *G. cuneatus*, from New Orleans, is found in Lake Pontchartrain and is used as food. Phillippi alludes to another, but does not give its specific name.

Family 2.—*LITHOPHAGA.*

The mantle of the animal is more or less cloven in front; the siphons behind more or less grown together; on each side are two leaf-shaped unequal gills; the foot bears a byssus and is small. The shell is oval, often somewhat irregular, equivalved; the hinge teeth are variable, lateral teeth none; the ligament external. The animals bore into rocks, balani, roots of sea weed, &c., and are found in all seas.

* Reeve's Conch. Systematica.

Saxicava. *Fleuriau de Bellevue.* (Hiatella *Daudin;* Diotonta *Schum;* Byssoyma *Cuvier;* Pholeobius *Leach;* Rhomboides *Blain.;* Biapholius *Leach.*) — *Shell* transverse, inequilateral, thick, gaping, rather variable in form; ligament external; teeth nearly obsolete or indistinct. *Animal* oblong, or claviform; mantle closed in front, except a very small opening for the passage of a digitiform foot, which is furnished with a byssal groove; siphons united nearly to the extremities; branchial and anal orifices large, margined with a fringe of (simple) cirrhi.* — Several species; also fossil.

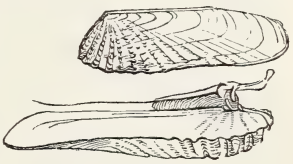
Saxicava rugosa.

The *Saxicavæ* perforate, or inhabit holes in rocks, oyster-shells, and roots of seaweeds. They are found in the South Sea, Mediterranean, Northern Ocean, &c. They live in calcareous rocks, into which the animal penetrates by means of its rasp-like foot, fretting it away very slowly, but yet sufficiently fast for the increasing size of its own body and shell, and thus forming a secure retreat. Masses of rock on the coast of England are frequently found pierced with innumerable small holes, the entrances to the habitations of these animals. In some places they actually do an immense amount of mischief; for in a few years they will destroy walls built of stone to prevent the incursions of the sea, perforating them till they are perfectly honeycombed, or fretted away. This has been the case with sea walls at Devonport, built of Portland stone. It has been observed that the operations of these little soft-bodied creatures have in some places "destroyed rocks, and made deep water where shoals

* Forbes's British Moll.

previously existed." M. Fleuriau de Bellevue, who has examined this family particularly, finds that the animals are phosphorescent.

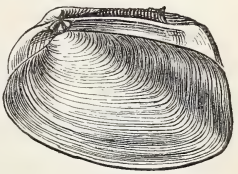
PETRICOLA. *Lam.*— *Shell* inequilateral, variously oblong, transverse, and equivalve, no epidermis; hinge furnished with two teeth on one valve, and one or two on the other; slightly gaping. *Animal* oval, mantle closed in front, except a small opening for a lanceolate or pointed foot; siphons united for nearly half their length; their orifices fringed with a double series of cirrhi, the longer ones pinnated on one side.* — 15 to 20 species; also fossil.



Petricola.

Found in many parts of the world in rocks, corals, &c., but most abundant in America. The shell is rather delicate, white, and radiated. Philippi places Choristodon of Jonas as a sub-genus.

RUPELLARIA. *F. de Bellevue.* (Venerupis *Lam.* Gastrana *Schum.*)— *Shell* oval, equivalve, inequilateral, very short anteriorily, posteriorily elongated, and obliquely truncated; hinge having either three teeth in each valve, or three in one and two in the other, which are small, and not diverging; ligament external; mantle impression with a deep sinus. *Animal*, having the mantle cleft as far as the siphons, which are very thick, short, united almost to the ends, beset with cirrhi at the opening; foot small, pointed, having a byssus; the gills are connected nearly the whole length, semicir-



Rupellaria.

* Forbes's British Moll.

cular, strongly wrinkled; the upper only half as broad as the under one: lip tentacles transversely striated, the inner one three times as broad as the outer one.—8 species; also fossil.

Philippi remarks that these shells are not easily distinguished from that division of Venus called *Tapes* or *Pullastra*, so that English conchologists generally class them together, but the animal differs, from the foot being small and bearing a byssus. It may be known from *Petricola* by its siphons being connected nearly to their points, and by its widely cleft mantle.

R. (Venerupis) *irus* and *perforans* are known in the European seas; others are found in the Mediterranean sea; they are often lodged in holes in rocks.

Clotho. *Faujas St. Fond.* — *Shell* oval, nearly regular, longitudinally striated, equivalve, sub-equilateral; hinge consisting of a bifid tooth curved like a crochet, larger in one valve than the other.* *Animal* unknown.—1 species fossil.

C. Faujasii is a fossil.

Family 3.—*ANATINACEA.*

The animals of this family have the mantle almost entirely closed, the front having only a narrow aperture for the small foot; two, generally long, thin breathing-tubes. The shell is thin, often iridescent; behind, somewhat gaping, often rather inequivalve; the ligament internal, sometimes provided with a moveable shelly piece. Found in the sea in all climates.

* Sow., Conch. Manual.

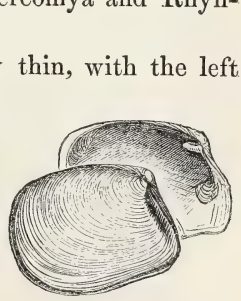
Anatina. *Lam.* (Auriscalpium *Megerle;* Laternula *Gray.*)—*Shell* transverse, thin, and almost transparent, gaping at one or both ends, having a spoon-shaped tooth in each valve and a small moveable appendage connected with the interior of the hinge; the tooth in each valve is supported by a small thin plate; ligament internal. *Animal* having an entirely closed mantle as far as a small front cleft forming an opening for the foot; both siphons are connected, and form a lengthened fleshy mass covered by the epidermis, the entrance to them is contracted by means of warty projections; both the gills on each side are connected before, and free behind; [according to Owen there is on each side only one gill existing] on each side are two mouth lobes; the foot is small, and has at the end a small round impression possibly serving as a sucker.—10 species; also fossil.

Anatina.

These delicate shells are found in the Indian and European seas, and those of New Holland and Africa. Some of them are very rare and beautiful, and extremely brittle. They are generally found in sands and shallow waters.

Philippi mentions as sub-genera Cercomya and Rhynchomya of Agassiz.

Periploma. *Schum.*—*Shell* very thin, with the left valve more ventricose than the right; hinge toothless; ligament double, the external portion thin, the internal part thick, placed upon prominent, sometimes spoon-shaped hinge laminæ and supported by a transverse bone; muscular impressions two, distinct;

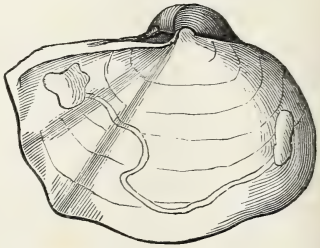


Periploma.

pallial impression sinuated posteriorly.* *Animal* unknown. —5 species; also fossil.

These shells are brought from the American seas.

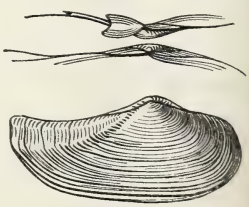
THRACIA. *Leach.*—*Shell* oval, oblong, thin, sub-equilateral, inequivalve, a little gaping posteriorily; hinge consisting of a more or less prominent spoon-shaped tooth in each valve receiving the ligament; pallial impression deeply marked. *Animal* with the mantle closed, except for the passage of a rather small compressed foot; siphons rather long, not united, and having fimbriated openings; a single branchial lamina on each side, and the mouth tentacles triangular, and comb-like.†—8 species; also fossil.



Thracia.

These shells are thin, fragile, sometimes rough, and generally covered with an epidermis. They are found in the Mediterranean Sea, and on the coast of Senegal; and several species on the shores of Britain.

MAGDALA. *Leach.* (Lyonsia *Turton;* Osteodesma *Desh.;* Pandorina *Scacchi.*).—*Shell* long, thin, iridescent, inequivalve, somewhat gaping at the sides; hinge toothless, linear, and having on each side a small sloping furrow, into which the ligament passes, which bears in its middle a small four-sided appendage; muscular impressions small, the pallial has a sinus behind. *Animal* having two short siphons, which are separated, and slightly pro-



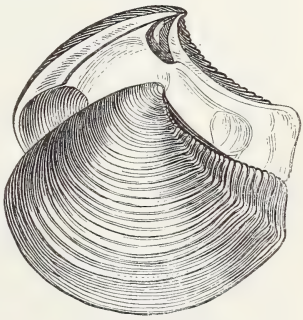
Magdala norvegica.

* Sow., Conch. Manual. † Forbes's British Moll.

jecting forward; they have fringed edges; foot narrow, long and compressed.—Few species; also fossil.

Mya Norwegica of Chemnitz is the type of this genus.

MYODORA. *Gray.*—*Shell* triangularly ovate, inequivalve; left valve concave, right flat; inequilateral, with a flat depression under the bosses; hinge formed of two wide lateral teeth in the right valve; in the left two grooves to receive them; ligament internal, inserted into a triangular pit between the teeth, often protected internally by a testaceous appendage; valves pearly within. *Animal* unknown.—10 species.*



Myodora striata.

Myodora striata is the most striking species of this genus; the author received several specimens from Port Nicholson in New Zealand, in a very perfect state, with the shelly testaceous appendage, or hinge piece still attached.

PANDORA. *Brug.*—*Shell* regular, oblong, valves unequal and inequilateral, the upper one flat, the lower convex; an obtuse oblong tooth in one valve, and a cavity to receive it in the other: interior somewhat pearly; ligament internal; muscular impressions weak, rounded; pallial with a very slight sinus. *Animal*, oval, compressed; the mantle closed, except for the passage of a narrow tongue-shaped foot; siphons very short, united nearly to their orifices, which are divergent and fringed; the

Pandora rostrata.

* Reeve's Iconica.

branchiæ of each side united into one; labial tentacles triangular.*—10 species; also fossil.

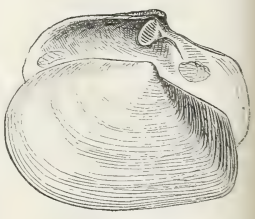
These Mollusca live in the sand at considerable depths, and are found principally in the seas of Europe. *P. striata*, a very pretty species, and *P. obtusa* are found on the English Southern shores. Some species come from the Persian Gulf and Pacific Ocean. The shells are all small and pearly within.

Anatinella. *Sow.* — *Shell* ovate, nearly equal, one end rounded, the other truncated or beaked; ligament internal, inserted between two spoon-shaped processes, one in each valve, and on one side of each are two cardinal teeth; no pallial sinus. *Animal* unknown. —1 species.

Anatinella Sibbaldii.

This shell is thin, fragile, and rather pearly inside. The species *A. Sibbaldii* is found on the sands of Ceylon; it is very like *Anatina*, but has no testaceous appendage.

Cochlodesma. *Couthony.* — (Ligula *Recluz.*) *Shell* thin, inequivalve; muscular impressions connected by a deeply sinuated pallial impression; hinge with a spoon-shaped process in each valve for the cartilage; external ligament slight, no shelly appendage; beaks fissured.† *Animal*, compressed; mantle closed, except anteriorly for the broad compressed foot; siphons long, slender, divided in their whole extent. — Few species; also fossil.



Cochlodesma.

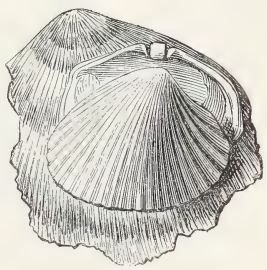
* Forbes's British Moll. † Sow., Conch. Manual.

Philippi remarks that *Mya prætenuis* of Pennant and *Anatina Leana* of Conrad belong to this genus.

Entodesma. *Philippi.* — *Shell* somewhat inequivalve, inequilateral, and slightly gaping, a strong epidermis: hinge with no teeth, each valve having a half-moon shaped projection, which supports the inner ligament: muscular, and pallial impressions, from the iridescence and thinness of the shell, not known. *Animal* unknown. — 1 species.

The species is brought from the Island of Chiloë.

Myochama. *Stutchbury.* — *Shell* inequivalve and irregular, with two diverging cardinal teeth in each valve, in the centre of which there is a triangular cavity, having a small testaceous appendage connected with it by a horny cartilage; one valve is attached and flat; the other is free and very convex, covered with ribs, or interrupted grooves, radiating from the imbones to the margin; the ligament is thin, and external; the pallial impression exhibits a short broad sinus.* *Animal* unknown. — 1 species.



Myochama anomioides.

Myochama anomioides is the only species found at Port Jackson, attached to other shells.

Family 4. — *CORBULACEA.*

The animals of this family are very little known. The shells are generally small, inequivalve, closed, the ligament internal. — Marine.

* Reeve's Conch. Syst.

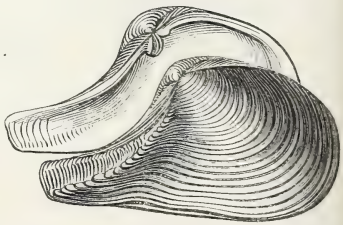
Corbula. *Brug.* — *Shell* short, thick, and sub-globose, inequivalve, and inequilateral, not gaping; one cardinal spoon-shaped tooth in each valve, no lateral, but on one side a deep pit for the insertion of the ligament; the pallial impression has a small sinus. *Animal,* short, with very short united siphonal tubes; orifices fimbriated; mantle closed, except in front, where there is an opening for a bony, narrow, thick foot of considerable dimensions; anal siphon with a conspicuous tubular membrane; labial tentacles slender.* — 43 species †; also fossil.

Corbula nucleus.

These small shells are met with in the seas of New Holland, China, the Philippines, South America, and New Zealand. ‡ They are pretty shells, often coloured within. *Corbula nucleus* and *ovata* are British. D'Orbigny states that some species live in brackish water, or even fresh.

This genus has been divided into the following genera: Potamomya *Sow.;* Ervilia and Sphenia *Turton.*

Neœra. *Gray.* (Cuspidaria *Nardo.*)—*Shell* like *Anatina* but having a small spoon-shaped process, and posterior lateral tooth in one valve, and an undefined ligamental pit, with no lateral tooth in the other. § *Animal,* oblong; mantle closed in front, except a plain-edged orifice



Neœra.

* Forbes's British Moll. † Reeve's Iconica.

‡ One of the few species found in the latter locality Mr. Reeve (in the Iconica) did the author the honour to name after her. She had received the shells from her friend Mr. Swainson, from Port Nicholson.

§ Sow., Conch. Manual.

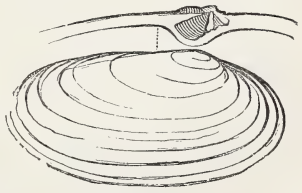
for the passage of a lanceolate foot; siphons short, united, unequal, the branchial largest, both bearing a few long, filiform cirrhi at their sides, extending beyond the orifices anal siphon with a very extensile membranous valve.* — 22 species; also fossil.

From the European seas. An English species, *N. Cuspidata*, is an elegantly formed shell, with a projecting beak, almost semi-transparent, and with a silky epidermis: it is rare.

Poromya. *Forbes.* — *Shell* ovate, or suborbicular, equivalve, inequilateral, slightly produced posteriorly; surface invested with a scabrous epidermis, beneath which it is pearly and minutely punctured: hinge, a minute cardinal erect tooth in one valve, lodged in a pit or impression in the other; no lateral teeth; ligament external; pallial impression very slightly sinuated. *Animal* unknown, probably resembling *Neœra.* — Few species; also fossil. *P. granulata* is British.

Family 5. — *MYACEA.*

The animal has an almost entirely closed, often very thick, and fleshy mantle; two thick siphons united together, but covered by a continuation of the epidermis; foot small; the shell is often somewhat inequivalve, gaping very widely on one or both sides; the ligament is sometimes external, sometimes internal. Marine.



Lutraria.

Lutraria. *Lam.* (Lutricola *Blain.*). *Shell* equivalve, inequilateral, transverse, gaping at both extremities; an erect cardinal tooth in one valve locking into a cavity in the

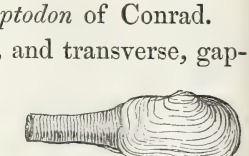
* Forbes's British Moll.

other, and a triangular pit; no lateral teeth; the spoon-shaped lobe contains the ligament; muscular impressions strong, pallial impression having a deep tongue-shaped sinus; an epidermis. *Animal*, thick, oblong, with much produced siphonal tubes, which are united almost to their extremities; mantle closed, except a rather large anterior opening for a foot of considerable dimensions; both it, and the siphons are partially invested with an epidermic sheath; orifices of the tube fimbriated; labial tentacles narrow, triangular, and pointed. * — Several species; also fossil.

Found in the mud at the mouths of rivers in temperate climates.

Philippi places as a sub-genus *Cryptodon* of Conrad.

Mya. *Lin.* — *Shell* strong, thick, and transverse, gaping at both ends, equivalve; a large spoon-shaped tooth in one valve, and a hollow to receive it in the other; ligament internal; an epidermis which extends over the siphons; pallial impression with a deep sinus. *Animal*, oblong, with long tubes enclosed in a strong coriaceous epidermis; mantle closed in front, except anteriorly, where there is an opening for the passage of a small conical foot; siphons united nearly to their extremities, which have fimbriated orifices; labial palpi striated. † — Several species; also fossil.



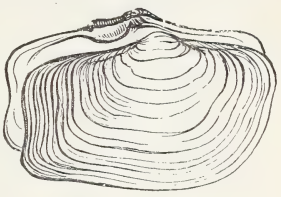
Mya truncata.

The species are found on the shores of European, Asiatic, and African seas, and are used as articles of food in many places. *M. arenaria* is the British species; one end of the shell gapes very much, and at the aperture the thick epidermis is lengthened out, so as to cover the siphonal tubes. The animal lies buried in sand and mud, allowing the tubes just to reach the surface.

* Forbes's British Moll

† Ibid.

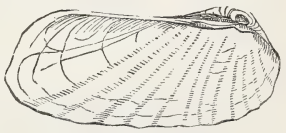
PANOPÆA. *Menard.* — *Shell* equivalve, oblong, transverse, more or less inequilateral, unequally gaping at both ends; one conical tooth in each valve, with a thick callosity on the side; ligament external; pallial impression deep, having a large sinus. *Animal*, oblong, and furnished with a very long and extensible siphonal tube; body and tube invested with a wrinkled brown leathery epidermis, continuous with the shell; mantle closed throughout its length, except a small opening with thickened lips in front anteally, for the passage of a short muscular foot; adductor muscles very strong; mouth surrounded by thickened lips, bearing four labial palpi; siphonal tubes united to their extremities; orifices inconspicuously fimbriated.*—Few species; also fossil.



Panopæa Aldrovandi.

This is a large handsome shell; but it is not often found perfect in collections. Very large specimens are shown in Chenu's work†, nine and a half inches from side to side, and six from the boss to the edge; this species is *P. Aldrovandi; P. Faujasii* is not quite so large. Specimens of *P. Norvegica* are occasionally found at Scarborough, where the fishermen make the valves into "'bacca boxes."‡ They are dug out of the sand, where they bury themselves several feet deep.

PHOLADOMIA. *Sow.* — *Shell* thin, transparent, white or yellowish, the inside pearly, transverse and oval, inequilateral, and slightly gaping at both ends; hinge having a long narrow hollow or pit and a pro-



Pholadomia candida.

* Forbes's British Moll. † Illus. Conch. ‡ Mag. of Nat. Hist.

jecting plate in each valve; ligament external; bosses worn by being placed near each other. *Animal,* Owen remarks that it is very similar to that of *Panopœa.* — 1 species; also fossil.

There is only one species known to be in existence at present, the *Pholadomia candida,* which is found after hurricanes at the island of Tortola; it is supposed to be a native of deep seas, and therefore only occasionally thrown up by the waves on to the shores, it is consequently scarce.

Allorisma. *King.* — *Shell* equivalve, elliptical, more or less inequilateral, closed, or gaping at both ends, never with radiating ribs, but having the lower edge of the valves strongly wrinkled; hinge toothless, the ligament placed on two shelly plates, which are lengthened in the direction of the hinge, but which vary, from a horizontal to a vertical direction; two muscular impressions, which have much the same position as those of *Thracia pubescens;* pallial impression with a deep sinus almost like *Mya arenaria.* — Fossil.

Edmondia. *De Koninck.* — *Shell* lengthened, equivalve, inequilateral, transverse, oval or rounded, with numerous cross and concentric stripes; the lunule is gaping; the hinge without teeth, their place supplied by a narrow cross, deep lamella, partially concealed by the boss, and probably carrying the ligament. — 2 species, fossil.

Glycimeris. *Lam.* (Cyrtodaria *Daudin.*) — *Shell* transverse, possessing no teeth, but thick projecting hinge-plates bearing the ligament; gaping almost all round; ligament external; bosses generally eroded. *Animal,* with

a thick mantle, and small opening for the foot; mouth having two large triangular tentacles, and there are two long, nearly equal gills. — 1 species.

Glycimeris siliqua.

G. siliqua is found in the Northern Seas, on sands, and is the only species.

Tellinomya. *Hall.* — *Shell* equivalve, inequilateral, beneath somewhat compressed, but lengthened near the bosses, the outline curved or angular; the shell is thin, furnished with thick lamellæ; the hinge without visible teeth, or even a furrow: two muscular impressions near the hinge; the hinder extremity often gaping; the pallial impression not known. — Fossil.

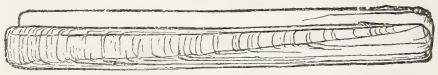
Arcinella. *Philippi.* — *Shell* equivalve, inequilateral, transversely oval; the bosses small, a little protruding; hinge without teeth; the upper edge of the right valve extends very far into the shell, and has a broad triangular notch under the boss (for an inner ligament?), behind which are two radiating ledges extending from the bosses; the left valve has its hinge edge on the projecting edge of the right; the ligament, muscular, and pallial impressions unknown. — Fossil.

Family 6. — *SOLENACEA.*

The animals of this family live buried in sand; the siphons are in some genera joined together, in others separated; the foot is thick, cylindrical, club-shaped, or compressed; the gills are lengthened, and floating with the point free in the breathing tube. The shell is regular,

equivalve, lengthened, gaping at both ends; the hinge is formed by teeth and an outer ligament. — Marine.

Solen. *Lin.* — *Shell* generally very long, straight, or



Solen siliqua.

arched, open at both ends, and equivalve; teeth small, and varying in number, with a lateral fulcrum in each valve; ligament external, elongated; bosses small. *Animal* very narrow, more or less cylindrical or compressed; mantle united at the borders, except anteriorly where it opens for the passage of a large, long, thick, oblique, truncated foot; siphons short, united, their orifices fimbriated; branchiæ prolonged into the inferior siphon; labial palpi long, narrow, and triangular.* — 30 species; also fossil.

The shells of *S. siliqua* and *marginatus*, common on the British coast, often attain the length of from four to ten inches; particularly those found near Belfast: the animals have a very muscular foot enabling them to bury themselves in the sand, in which they form holes perpendicular to the surface, occasionally to the depth of a couple of feet, and which they ascend and descend as occasion requires; they are sometimes used as food; but in places where they abound, they are sought after as bait for fish, and are captured in a singular manner. The retreat of the creature having been observed, the fisherman throws into the entrance a small quantity of salt, which quickly causes it to make its appearance, that substance in its pure state appearing to have a very irritating effect upon the animal, although an inhabitant of salt water; as soon as it is

* Forbes's British Moll.

visible at the surface, the person lying in wait for it snatches hastily at it, and if he succeeds in grasping it firmly, makes good his capture; should he, however, fail, and the animal escape by gaining its retreat again, the application of more salt produces no farther effect, either from the mollusc not being sensible to the additional irritation, or perhaps from the instinct of self-preservation causing it to suffer the inconvenience in preference to running the risk of capture: in this case, the only method of securing it is to dig it out of the sand with a spade or other instrument.

Forbes remarks that *S. marginatus* is amongst the most delicious of shell fish, and that broiling is the best method of preparing them. Besides the above British species, *S. ensis, legumen,* and *pellucidus* are extremely elegant shells. Other species come from America, India, &c., some of them very beautiful.

Philippi includes as sub-genera Vagina *Muhlf.*, Cultellus *Schum.*, Siliqua *Muhlf.*, and Macha *Oken.*

Psammosolen. *Risso.* (Solecurtus *Desh.*) — *Shell* equivalve, ovately oblong, transverse, gaping at both

Psammosolen radiata.

ends, and even on the ligamental side, and having the external surface covered with fine undulating lines; two cardinal teeth in one valve, and one, rarely two, in the

other, but not locking into one another; ligament in the middle, thick and external; pallial impression very deeply sinuous. *Animal* oblong, very large and thick in proportion to its shell; mantle closed in front, widely open anteally for the passage of a large linguiform foot, and posteriorly for the siphons, which are deeply separated at their extremities, united, and forming a thick mass at their bases; labial palpi triangular, narrow, lamellated on their inner sides; a large portion of the branchiæ is lodged in the branchial siphon.*—6 species; also fossil.

P. strigilatus is found in the Mediterranean; several species are British.

Cleidophorus. *Hall.* — *Shell* equivalve, inequilateral, elliptical; the hinge without teeth or furrow; the boss has an oblique linear pit, to which there is an answering rib in the interior of the valve; the upper surface is concentrically striped: as the muscular and pallial impressions are unknown, the exact situation in the systematic arrangement must remain doubtful; the description of the hinge resembles in some measure that of *Solenomya*.—Fossil.

Family 7.—*PHOLADEA.*

The animals of this family have the mantle almost entirely closed, a thick short foot, the siphons united together, the gills very long and pointed, free at the ends, and reaching far into the breathing tube. The shell has no true hinge, and no ligament; under the bosses is a spoon-shaped process, to which the strong foot muscles are attached. The animals bore into stone, wood,

* Forbes's British Moll.

and other foreign bodies, lining sometimes their dwelling with a shelly substance. — Marine.

PHOLAS. *Lin.* — *Shell* gaping at both ends, particularly anteriorly, equivalve and transverse, having a flat, recurved, spoon-shaped process in each valve below the bosses, which are near one end of the valves, covered by a callosity, and having also accessory pieces attached; pallial impression deeply sinuated. *Animal* having the lobes of the mantle united in front except for a small space for the foot, reflected dorsally to cover the bosses; a long siphon divided near the extremity, and bordered with cirrhi; foot short, thick, and truncated at the end. — 42 species *; also fossil.

Pholas dactylus.

These molluscs inhabit indurated mud or clay, wood, and stone, into which they bore when young, and in which they continue to reside until their death. It was not decidedly known in what manner these soft-bodied animals, inhabiting so fragile a tenement, were able to penetrate hard substances, whether by the aid of a corrosive agent, or by the action of the valves, which in most cases are rough and able to rasp away particles of rock, when rubbed against it. Mr. Forbes inclines to the latter opinion: he says there is no evidence of a secreted solvent. Mr. Hancock, however, has discovered that all the boring mollusks have the foot and front part of the mantle armed with little crystalline bodies, which form rubbing or rasping instruments of very great power, and that it is by this means they form their habitation in the solid rock.† They are, from their habits, exceedingly

* Sowerby's Thesaurus.

† See an interesting paper on this subject in the Annals of Nat. Hist. 2nd vol. 2nd series.

destructive to piers or wooden buildings under water. The breakwater at Plymouth, soon after its erection, was attacked by *Pholades:* it is constructed of limestone.* In order to counteract their operations, nails are closely driven into piles that lie under water, as is the case with the pier at Southampton.

The generality of the shells of this species are milky white, and elegantly marked with rows of small prickles: the animals are not used in this country as food, but on the shores of the Mediterranean, where some large species are found, they are not uncommonly eaten. When they are irritated, they are said to throw out a stream of water to a considerable distance.

The animal is phosphorescent; this fact is mentioned by Pliny, as well as by modern authors. The liquid shines with uncommon splendour in the dark, and illuminates whatever it touches or happens to fall upon. "It illuminates the mouth of the person eating it, and is more luminous the fresher it is; when dry its light will revive, on being moistened with salt water or fresh; brandy extinguishes it."† Forbes says, this luminous mucous is thrown off into the water, so that the currents proceeding from the animal are luminous.

This genus inhabits the European, American, and Indian seas.

Philippi enumerates the following as sub-genera: Barnea *Risso;* Martesia *Leach;* Pholadidea *Turton.*

JOUANNETIA. *Desmoulins.* (Triomphalia *Sow.;* Pholadopsis *Conrad.* — *Shell* globular, having behind a tail-formed appendage; the spoon-shaped processes of the

* Penny Cyclopædia, art. *Pholas.*

† Priestley's Optics.

genus *Pholas* are in this supplied by a kind of partition; the accessory valve is large and shield-formed. —3 species; also fossil.

Found living in the Philippines and W. Columbia.

XYLOPHAGA. *Turton.* — *Shell,* valves equal, inequilateral, and very much gaping anteriorily; two small accessory testaceous pieces placed near the hinge; one small tooth in each valve, with an internal rib running from the boss to the margin. *Animal,* foot large and pillar-shaped, occupying the greater part of the anterior opening, and may be protruded to some length; the margin of the mantle plicated; siphons very extensible, as far as three-quarters of an inch.*—A few species.

Xylophaga dorsalis.

The shells of *X. dorsalis* are found in light wood, or pieces of stick, which the animals penetrate to the depth of about an inch.† *X. globosa* appears to differ but slightly.

TEREDO. *Lin.* — *Shell,* attached to the animal, valves gaping, and having a long recurved tooth under the boss of each; the tube is long, irregular, and open at both ends. *Animal* vermiform; mantle tubular, slightly open anteriorly; siphons very long, bifurcating at their extremities, orifice fringed; a muscular ring, into which are inserted two variously shaped calcareous pallets at the part where the siphons divide; branchiæ continued into the siphonal tube; foot rudimentary, sucker shaped. ‡ — Many species; also fossil.

Teredo navalis.

* Forbes's British Moll.

† Reeve's Con. Sys.

‡ Forbes's British Moll.

The *Teredo* is almost the only mollusc which is to any extent injurious to mankind, and this is owing to the animal forming its abode in wood which it meets with in the sea, such as dead and floating trees, piles, and even ships: it is worm-shaped, and about six inches long. In making its excavations into the wood, which it does by boring into the substance in the direction of the grain, and lining the tube with shell, each individual is careful to avoid that formed by its neighbour, and often a very thin leaf alone of wood is left between; it also, when a knot occurs in its path, makes a turn to avoid it.

A great proof of the manner in which the operations of this little animal may become prejudicial to us was furnished some time ago (1730) in Holland. In that country a considerable portion of the land and coast is below the level of high water; and in order to prevent the irruption of the sea, immense dikes have been constructed along the shore, formed of large masses of sand, and strengthened by large piles driven into the ground: these piles were attacked by the Teredo, and, on examination, were found to be pierced in all directions to such an extent, that, had it not been for a timely discovery of the mischief, the whole of that part of the country might have been overwhelmed by the sea breaking through the enfeebled and worm-eaten defences.

Mr. Forbes justly remarks, however, that "with the evil comes good, for it acts as a clearer of the seas, breaking down into small fragments the useless masses of floating timber and fragments of wreck, which might otherwise prove serious and dangerous impediments to navigation."

Dr. Mantell speaks of fossil remains of the Teredo in the following words:—"The fossil species differ from the recent in the valves being united to the calcareous tube.

Wood perforated by Teredines, and occupied by their shelly tubes, occurs in almost every locality of the London clay. Those specimens in which the wood is petrified, and the cavities of the tubes are filled with calcareous spar of various colours, furnish beautiful sections, when cut and polished."*

Found in the European and Indian seas. Sir Everard Home mentions a species called *T. gigantea*, which sometimes exceeds four feet in length and several inches in circumference.

Cuphus. *Guettard.* (Furcella, *Lam.*; Septaria, *Lam.*; Cloisonnaria, *Fer.*; Clausaria, *Menke.*) — The tube only of this genus is known, it is calcareous, large, gradually widening, at the smaller end divided into two tubes by a partition; the valves and the animal have not been described. — 1 species.

Teredina. *Lam.* — *Shell* equivalve, inequilateral, bosses prominent, adhering to the outside of the rounded end of a shelly tube; aperture of the tube with a division; a flat additional piece is placed on the bosses.—Fossil.

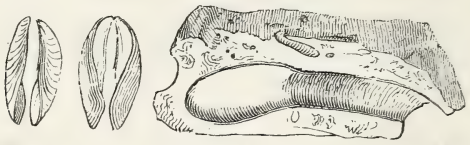
Family 8.— *GASTROCHÆNACEA.*

The animal has the mantle completely closed up, as far as a narrow frontal opening through which the small pointed foot protrudes, which sometimes bears a byssus; behind, the mantle is lengthened into two siphons, joined together in their entire length. The shell is equivalve, without hinge, often without ligament, or spoon-shaped

* Medals of Creation.

process under the bosses; the animal generally constructs a shelly tube in which it is enclosed. Only known in temperate and warm climates.

GASTROCHÆNA. *Spengler.* (Chæna, *Retzius.*)—*Shell* wedge-shaped, equivalve, inequilateral, gaping very



Gastrochæna modiolina.

widely on the anterior side, united by a ligament, and having no teeth, but in the interior a small spoon-shaped process; the tube is calcareous, free or fixed, and bottle-shaped. *Animal* wedge-shaped, or elongated when the siphons are extended; these are separated only at their extremities, orifices fringed; mantle closed and thickened where exposed; with a very small opening for the small pointed, curved, and finger-shaped foot, which sometimes spins a delicate byssus; mouth with two equal simple lips, and a pair of sickle-shaped labial tentacula.*—3 species, also fossil.

The *Gastrochæna* penetrates and makes its abode in hard substances; it seldom exceeds half an inch in length, and inhabits the coast of Great Britain, the Isle of France, and America. Mr. Sowerby relates that he has an oyster-shell in which about a dozen of these little animals have taken up their abode, the shelly tubes projecting more or less beyond the surface, but generally where they are protected by the irregularities of the oyster-shell.†

* Forbes's British Moll. † Genera of Shells.

G. modiolina is the English species, found principally at Torbay.

CLAVAGELLA. *Lam.*—*Shell*, valves very small, the one being attached to the exterior, the other free in the interior of the tube, which is narrow and open at one end, club-shaped and spiny at the other. *Animal* having a sack-formed, closed mantle, the front with a small cleft, from which projects the point of the small vermiform foot, and ending behind in two short, entirely connected siphons, the connecting part having a fringed edge and the mouths of the siphons beset with simple cirrhi; the mantle is on the lower side very thick and fleshy, and still has a small opening at the origin of the siphons, like *Aspergillum*, and *Pholadomya;* the mouth has four lengthened, lunar, somewhat curved tentacula; on each side is a single, thick, striped gill, which behind is joined with that of the contrary side, and has above a small appendage, which can only be compared to a second gill. — Several species; also fossil.

Clavagella aperta.

There are very few recent specimens of this shell: some have been brought from the Australian and Polynesian islands, also from the Mediterranean; one living individual from the bay of Guayaquil. They perforate stones, corals, and even other shells.

ASPERGILLUM. *Lam.* (Arytæna, *Oken;* Clepsydra, *Schum.*)—*Shell*, a tube resembling the spout of a watering-pot, being thicker at one end than the other, the smaller one open, and the larger one closed by a plate, which is perforated with small holes; valves situated outside near the plate, the tube terminated by several smooth undulations, like frills. *Animal* having an entirely closed mantle, which has only behind, two openings for the

passage of water, &c.; before, a small cleft, and finally four small openings in the middle of the body, like *Clavagella* and *Pholadomya;* the foot is rather large, oval, thickened in front, compressed and pointed behind; the gills are simple, having on each side a long furrow, which indicates the division into two leaves; the mouth has on each side a pair of lancet-formed lip tentacles.—20 species.*

Aspergillum Javanum.

This very curious shell derives its name of *watering pot,* from its form, and varies in length from seven or eight inches to a foot; it is supposed by some authors to attach itself to the rocks by a byssus passing through the holes in the plate which terminates its tube, but it has generally been found on the sand: its colour is white, with a slight tinge of grey or pale red.

The *Aspergillum agglutinans,* from New Holland, has the disk or plate differently constituted from the other species: instead of the small holes, slender tubes are substituted, separate and unequal, with a fissure in the centre. Its specific name is derived from the circumstance of the tube being constantly covered with sand, fragments of shells, and madrepores. The *Aspergillum Javanum,* from New Zealand and Java, is the most common species.

"The row of slender tubes round the disk is supposed to be filled with fleshy filaments from the mantle. The upper end of the tube, which is rarely obtained perfect, is more or less attenuated; and terminating in smooth un-

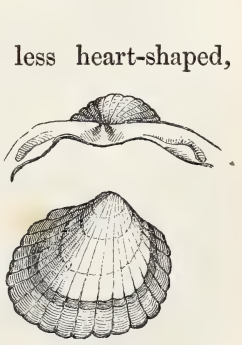
* Chenu, Illustrations Concholiogiques.

dulations, is reflected at the margins. This reflected extremity is left entire at certain periods of growth, and the tube is recommenced according to the necessities of the animal. Some specimens have been found with four or five of these entire reflections."* They live buried in the sand of the shore, and place themselves perpendicularly. When they ascend, the narrow end appears first; this contains the siphons by which the animal receives and rejects the water so necessary to its existence; these are attached to the tube at the point where the small valves are situated.

Family 9.—*CARDIACEA.*

The animal has the mantle cloven more than half way, the back part beset with cirri, and running out into two short tubes; the foot varies in the genera; the shell is equivalve, heart-shaped, with prominent bosses; the ligament is exterior, two muscular impressions, and the pallial impression without a sinus. Living in the seas of all zones.

Cardium. *Lin.* — *Shell* more or less heart-shaped, usually inflated in form, equivalve, nearly equilateral, posterior side sometimes gaping; the exterior is seldom smooth, generally radiatedly ribbed, and the borders of the valves toothed and plaited, and locking into each other; two cardinal and two lateral teeth in each valve, ligament exterior, bosses prominent. *Animal*, suborbi-



Cardium edule.

* Reeve's Con. Sys.

cular, tumid, its mantle freely open in front, with plain or less frequently fringed edges, conspicuously fimbriated in the neighbourhood of the very short, slightly separated siphons, the branchial one of which, is always fringed at the orifice; foot very large, cylindrical, geniculated; branchial leaflets unequal, labial palpi rather long, and triangular.*—133 species†; also fossil.

Some of the species are very beautiful, and others very singular in form; amongst the latter is the species *Cardium cardissa*, in which the valves are flattened, but in a contrary manner to the generality of flat Bivalves. This genus is found almost everywhere lying buried in the sand near the sea-shore, but by means of their long elbow-shaped foot, the animals have the power of leaping to a considerable distance. *Cardium edule*, the common species, is frequently used as an article of food, and in times of scarcity is most valuable. The most striking in form and colour, are found in the Indian Ocean, and the African Seas. There are many beautiful fossil species of this genus, of which more than thirty are found in British strata.

Philippi includes as sub-genera: — Cardissa *Meg.* and *Muhlf.*; Adacna, Monodacna, and Didacna of *Eichwald*; and Serripes of *Beck.*

PROTOCARDIA. *Beyrich.* — *Shell* equivalve, somewhat equilateral, globose, truncated behind, and the edges of the valves untoothed; one or two cone-shaped hinge teeth, and on each side a lateral tooth; the pallial impression has a sinus behind. The upper surface is entirely smooth, or transversely furrowed, the posterior side only having radiated stripes.—Fossil.

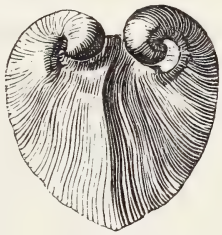
* Forbes's British Moll. † Reeve's Iconica.

CONOCARDIUM. *Bronn.* — *Shell* equivalve, thick, the anterior side flatly compressed, the posterior more or less lengthened; on the fore side, next to the almost straight hinge edge, appears a cylindrical cone-shaped process which seems to indicate a peculiar organisation of the animal, and which has usually opposite to it, one of a longer diameter. — Fossil.

This fossil shell is little known, and not well described.

GOLDFUSSIA. *Castelnau.* — This genus has not been particularly characterised, but mentioned slightly as *Cardium? nautiloides.* Each valve somewhat resembles a compressed Nautilus; both sides keeled. — Fossil.

ISOCARDIA. *Lam.* (Bucardium *Muhlf.*) — *Shell* heart-shaped, equivalve, inequilateral; bosses very prominent, rather spiral, recurved in the same direction, and not touching each other; cardinal teeth two, lateral, one in each valve; ligament exterior. *Animal*, shaped like the shell, open in front for the broad triangular, compressed, pointed foot; siphonal orifices sessile, their margins fringed, mantle double-edged.* — 5 species†; also fossil.



Isocardia cor.

The bosses of this shell are so peculiar that they easily indicate the genus. The *Isocardia* lives usually in the sand within reach of the waves, and is found in Europe, the East and West Indies, China, and New Holland. Mr. Reeve, in his monograph of this genus, says that *I. cor.* is

* Forbes's British Moll. † Reeve's Icon.

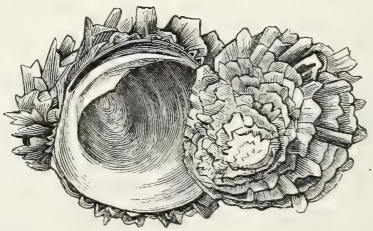
a Mediterranean species, and larger than the Irish specimens, which he calls *I. Hibernica.* Capt. Laskey has found them off the North Foreland, the Hebrides, and St. Abb's Head. *I. Moltkiana* is a beautiful species, and of great rarity, from China.

CARDIOMORPHA. *Koninck.* — *Shell* equivalve, inequilateral, thin, generally crookedly or transversely lengthened; the hinge linear, untoothed, hinge plate smooth, and taking in the entire upper edge of the boss to its hinder extremity: the ligament is linear, and exterior; the bosses are curved towards the front; two superficial muscular impressions; pallial quite simple. — Fossil.

Family 10.—*CHAMACEA.*

The animal has the mantle for the greater part divided; behind, there are two short siphons beset with cirri at the edge; foot small. The shell is attached to rocks, and is irregular; the hinge has a thick, oblique tooth which passes into a hole in the other valve. Found principally in the seas of hot climates.

CHAMA. *Lin.* (Jataronus *Adans.*) — *Shell* irregular,



Chama lazarus.

spiny, or rough, inequivalve; bosses recurved and un-

equal, turning either to the right or left; one thick and long tooth in one valve, and a deep pit in the other; ligament external. *Animal,* with the two folds of the mantle for the most part separated; behind they are united, and form two very short siphons, whose edges are strongly beset with cirrhi; the foot is small, cylindrical, truncated, and bent in the form of a knee; the mouth is small, and has on each side a pair of almost four-sided, crookedly truncated tentacles.—55 species*; also fossil.

These shells appear to present almost every variety of shape and colour; the former fact is perhaps owing to the accidents of their position, as they are found usually at small depths in the sea, affixed by the larger valve to rocks, &c., and occasionally united together in large masses. They are so firmly attached that it is difficult to avoid breaking the shell when they are removed. They are confined to warm climates, the Mediterranean being the lowest temperature.

Diceras. *Lam.*—*Shell* inequivalve; bosses very much lengthened, distorted, and turned different ways, attached to substances by the point of the larger boss; one large tooth in each valve; pallial impression without sinus.—2 species fossil.

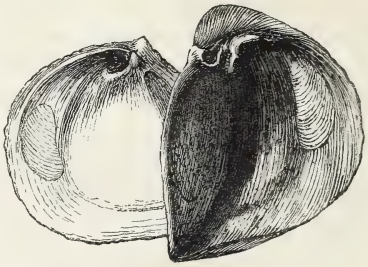
Diceras.

These curious shells are found only in the fossil state, and are of very irregular form; the two almost spirally twisted bosses looking like a pair of horns; and the larger of the two bearing the appearance of having been attached to other substances.

Chamostræa. *Roissy.* (Cleidothærus *Stutchbury.*) —*Shell* inequivalve, and somewhat pearly in the interior;

* Reeve's Iconica.

the attached valve is very convex, the other flat, having a small pointed tooth fitting into a corresponding pit in the former; and there is a long recurved testaceous appendage, called the clavicle, connected by a cartilage at both ends to a deep cicatrix under each umbo; the muscular impression of the mantle is entire, and the ligament is external.* *Animal* unknown.



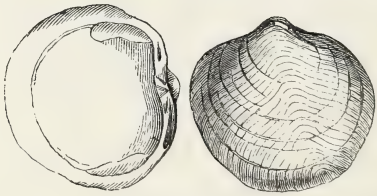
Chamostræa albida.

Stutchbury first observed the curious testaceous appendage in the interior; the only species is *C.* (Chama) *albida* Lam. from New Holland.

Family 11.—*LUCINACEA.*

The animal has the mantle open before; behind, there are two simple openings for the passage of the water, which has been through the gills; tubes sessile, or of varied form; the foot also varies in the genera. The shell is roundish, seldom much longer than broad, equivalve, closed; the pallial impression has no sinus.—Found in the seas of all zones.

LUCINA. *Brug.*—*Shell* nearly round, equivalve, in-



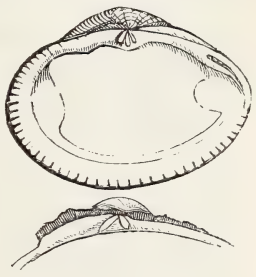
Lucina divaricata.

* Reeve's Con. Sys.

equilateral; bosses small, and pointed, the outer surface sculptured; cardinal and lateral teeth distinct, but variable in number. *Animal* orbicular, its mantle freely open in front, with plain or fimbriated edges; siphonal orifices sessile; the anal sometimes provided with a retractile produced tube (anal valve?); foot very long, ligulate, tubular; branchial leaflets of each side united into one; labial palpi obsolete.*—69 species†; also fossil.

A pretty genus of bivalves: they are found in Europe, America, New Holland, &c., and six are British.

Fimbria. *Muhlf.* (Corbis *Cuvier;* Idothea *Schum.*)—*Shell* transverse, equivalve, nearly equilateral; bosses curved inwardly; cardinal teeth two, lateral two, one of which is remote. *Animal* not much known; according to Valenciennes it has only one gill on each side, and no lip appendages. —2 species; also fossil.



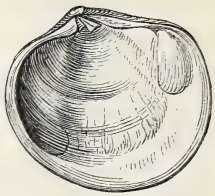
Fimbria fimbriata.

The shells of this genus are thick and solid: there are few species in a recent state, and they are rare. They may be easily distinguished by the longitudinal and transverse undulations or ridges crossing the external surface of the valves. The species known to Linnæus he named *Venus fimbriata,* it is of a white colour, and tinged with pink occasionally. They are from India.

Diplodonta. *Bronn.* (Mysia *Gray,* not of *Leach.*) — *Shell* equivalve, more or less suborbicular, inequilateral, nearly smooth or marked by lines of growth; hinge com-

* Forbes's British Moll. † Reeve's Iconica.

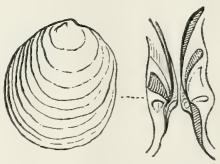
posed of two primary teeth (one of which is bifid) in each valve; no lateral teeth; ligament external; no lunule; muscular scars nearly equal, ovate; pallial impression single. *Animal* shaped as the shell; mantle open in front, simple at the edges; siphons wanting (?); branchial lamillæ on each side of the body not united into one; labial palpi developed, triangular; foot lanceolate.*—10 species; also fossil.



Diplodonta.

Shells without any colour, found in the Mediterranean, and *D.* (Tellina) *rotundata* on the British shores.

Ungulina. *Daudin.* — *Shell* transverse or almost round; valves nearly equilateral, and not gaping; one bifid cardinal tooth in each valve, and at the side a long pit containing the ligament; no lateral teeth. *Animal,* having sessile siphons, and somewhat similar to *Lucina.* — 2 species.



Ungulina transversa.

These shells are small, thin, transparent, and have a very strong epidermis; they appear to be found in the fresh waters of Senegal.

Scacchia. *Philippi.* — *Shell* rather oval, equivalve, inequilateral, very thin and smooth, closed; the hinge shows one or two small cardinal teeth, and slight side teeth; two small, tolerably even, round muscular impressions and no sinus. *Animal,* with the mantle almost entirely cloven, closed behind, with a single opening; the foot is compressed, tongue-shaped, separated by means of

* Forbes's British Moll.

an interlacing, from the intestines; on each side are two leaf-shaped gills, the inner one is united with the outer in the front, behind, the two inner gills are united; the lip tentacles are rather long. — 2 species; also fossil.

The living species are found in the Mediterranean.

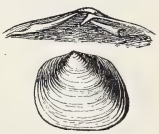
THYASIRA. *Leach.* (Axinus *Sow.*; Cryptoton *Turton*; Ptychina *Phil.*) — *Shell* free, equivalve, transverse; anterior side short; posterior side produced, truncated, with a lunette near the bosses; hinge having a long oblique ligament placed in a furrow. *Animal* unknown. — 2 species; also fossil.

Found in the Northern Sea and the Mediterranean.

CHIRONIA. *Desh.* — *Shell* regular, equivalve, thin, with an epidermis; the hinge narrow, on the right side of which is a curved tooth, directly under the boss, and an oblique hinder lateral tooth; in the left valve are two similar teeth, but smaller; a short, very broad inner ligament between the teeth of the hinge, resting on small oblique, spoon-shaped processes, which are entirely hid under the bosses; two muscular and one pallial impression. *Animal* unknown. — 1 species.

Found on the German shores.

KELLIA. *Turton.* (Erycina *Payr.* not *Lam.*; Bornia *Phil.*; Pythina *Hinds.*) — *Shell* thin, equivalve, subequilateral, suborbicular, tumid or compressed, closed, smooth or concentrically striated; beaks incurved, small, inner margin smooth; hinge composed of one or two primary teeth in either, and a lateral one in both valves; ligament internal, or submarginal, in some species placed in a cartilage-bed, formed of the thickened hinge margins of each valve



Kellia.

in others, interrupting the hinge margin; muscular scars, suborbicular; pallial sinus entire. *Animal* suborbicular, its mantle much closed, furnished posteriorly with a single very short siphonal (anal) tube, and anteriorly prolonged into a canal, or hyaline tube, of considerable dimensions, the margins of which are either united, so that a separate orifice is formed, or open, so as to be continuous with the pedal slit; foot ligulate, furnished with a byssal groove; branchial leaflets free; lateral palpi triangular.* — Several species; also fossil.

Mr. Alder says that *K. suborbicularis* which is found on the English shores, produces a very delicate thread, and suspends itself freely by a single, almost inconspicuous fibre, strengthened by a double attachment at the top. It lives in crevices of rocks, or sea-weed roots.

Lasea. *Leach.* (Cycladina *Cantraine;* Poronia *Recluz.*) — *Shell* almost entirely similar to *Kellia,* but smaller, mostly of a reddish colour, and the inner ligament on a projecting process, and not immediately under the bosses. *Animal* with a byssus according to Lovén. — Several species.

Philippi says that the type of this genus is the small shell *Cardium rubrum* of Montague, found on the British shore.

Lepton. *Turton.* — *Shell* flat, rarely orbicular, equivalve, inequilateral, a little open at the sides; hinge of one valve with a single tooth, and a transverse linear lateral one on each side; the other valve has a cavity in the middle and a transverse deeply cloven lateral tooth on each side, the segments of which divaricate from the boss; pallial impression simple. *Animal* compressed, mantle freely open in

Lepton.

* Forbes's British Moll.

front, its margin extending considerably beyond the shell, and bearing superiorily a fringe of filaments, one of which is much larger than the rest; a short siphonal tube, with a single aperture at the larger end of the shell; foot thick and tapering, keeled and disked, furnished with a byssal groove; branchial leaflets two on each side, and separate.* — Few species.

Two British species, one of which, *L. squamosus*, Mr. Alder says, has a long filament which waves to and fro when the animal creeps, as if it were for the purpose of feeling the way; it spins a few threads.

CYAMIUM. *Philippi.*—*Shell* equivalve, transverse, somewhat inequilateral, thin, scarcely gaping; two cardinal teeth in each valve, no lateral teeth; the ligament is double, the inner, is situated in a triangular pit which is formed in both valves behind the cardinal teeth; the pallial impression simple, without a sinus. — 1 or 2 species.

Philippi mentions, *C. antarcticum*, a native of Patagonia; Lovén alludes to another.

MONTACUTA. *Turton.* — *Shell* small, thin, equivalve, inequilateral, transversely oblong, or obliquely oval, surface smooth or concentrically striated, or rarely radiatingly furrowed; beaks inflected; inner margins smooth; hinge margin with a triagonal incision and cartilage pit, and a pair of diverging laminar teeth in one or both valves; ligament internal; muscular scars suborbicular; pallial impression simple. *Animal* oblong, its mantle freely open in front, with simple margins; not furnished with siphonal tubes posteriorly, a single siphonal

Montacuta.

* Forbes's British Moll.

orifice (anal) or none (?); foot very large, strong, and broad, furnished with a byssal groove.*—About 6 species.

From the Atlantic; three of the species are British.

Family 12. — *GALEOMMACEA.*

The animal has the mantle cloven as far as the middle, with a small opening behind for the egress of the water, the edge is entire, on the surface are situated several spots of wart-like cirrhi; the foot is almost cylindrical, worm-shaped, it is used in creeping; on each side are two equal gills, free behind; and on each side of the mouth two rather oval tentacles. The shell is equivalve, equilateral, at the ventral edge gaping widely with a long oval opening; the bosses are small, the hinge without teeth; two small distant muscular, and one simple pallial impression. — Marine.

Galeomma. *Turton.* (Parthenope Scacchi.) — The shell and animal are both described above. — 4 or 5 species.

Galeomma.

G. Turtoni is a very delicate shell, pure white, found occasionally on our southern shores, at Guernsey, and in the Mediterranean. Mr. Forbes gives the following interesting statement from the notes of Mr. Clark, made when he captured one at Exmouth. He states:—"During twenty-four hours we kept it alive in a saucer, and three or four different times it spun a byssus, once detaching itself and leaving the threads behind, crawling to a short distance, and then again attaching itself. We had the good fortune to witness the operation. From the slit at the root of the

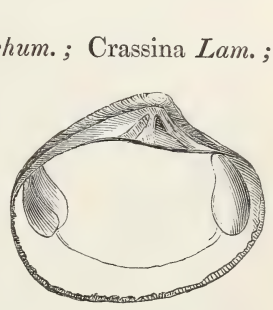
* Forbes's British Moll.

foot, a light green glutinous matter was poured out with such rapidity that in less than five minutes the animal was fixed. When detached it opened its valves, laying them on each side nearly flat, and marched across the saucer by means of its foot with such rapidity that ten could scarcely be counted: it seemed to be considerably assisted by the large margins of the mantle." M. Mittre states that it lives on the roots and leaves of fuci at a depth of three to four fathoms, and looks like beautiful pearls when seen beneath the water.*

Family 13. — *ASTARTACEA.*

The animal has an almost entirely cloven mantle with only one opening for the passage of the water, &c.; the foot hatchet-shaped, and no byssus. The shell is round, slightly triangular, perfectly closed, the hinge teeth two in each valve, with sometimes indications of lateral teeth; generally an external ligament, and the pallial impression has no sinus. — Marine.

Astarte. *Low.* (Tridonta *Schum.*; Crassina *Lam.*; Nicania *Leach*; Goodallia *Turton*; Mactrina *Brown*; Thetis *Adams.*) — *Shell* equivalve, inequilateral, nearly orbicular, but somewhat transverse; two diverging teeth in the right valve, with one distinct, and one obsolete tooth in the left; covered with a brown epidermis; one of the muscular impressions is divided into two; ligament external; there is no sinus



Astarte Danmoniensis.

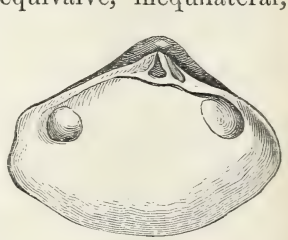
* Forbes's British Moll.

to the pallial impression; lunule almost always distinct. *Animal* the shape of the shell, and never exceeding it; its mantle freely open with plain (always?) margins, slightly united posteriorly at two points, so as to form two siphonal orifices, both with simple edges; foot linguiform, strong but not large; labial tentacles large, lanceolate; leaflets of each pair of branchiæ equal, or nearly so.* — Many species; also fossil.

Six of the species are found on the British shores; the one most commonly known is *A. danmoniensis.* One is found is Sicily, others in America; they are generally on sandy mud at variable depths.

Pronoë. *Agassiz.* — *Shell* separated from *Astarte,* on account of the very lengthened front muscular impression, and a shallow mantle sinus; the large hinge teeth project in the left valve, corresponding to cavities in the right. — Fossil.

Crassatella. *Lam.* — *Shell* equivalve, inequilateral, solid, and heavy, not gaping; hinge very thick, cardinal teeth, two in one valve, one in the other, lateral teeth scarcely seen; a triangular pit under the bosses, for the internal ligament; muscular impressions very distinct, pallial simple. *Animal* unknown. — 19 species†; also fossil.



Crassatella.

Mature specimens of this shell are very thick; their locality is New Holland and the southern seas, also the South American coasts. Some species are covered with a strong epidermis, and they are generally rare.

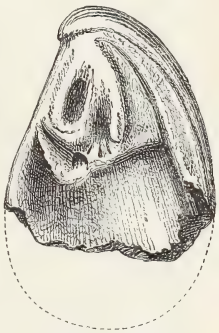
Cardinia. *Agassiz.* (Sinemuria *De Christol;* Pachy-

* Forbes's British Moll. † Reeve's Iconica.

odon *Stutchbury;* Thalassina *Quenstedt.*) — *Shell* (according to Koninck) mostly thin, equivalve, inequilateral, closed, transverse, furrowed; the hinge consisting of a single cardinal tooth with an oblique pit near it, and two distant lateral teeth; the front side tooth of the right, and the hinder side tooth of the left valve lock in; two simple muscular impressions, and a single small pallial impression; a double ligament, the one inward lying in the above-named pit, the other outward, short; the curved bosses rest on each other. — Fossil.

MEGALODON. *Sow.* — *Shell* equivalve, longitudinal, acuminated at the umbones, thick; hinge forming an incrassated septum across the cavity of the shell, with a large bifid tooth in the right valve, and one irregular, and one pointed in the left; ligament long, external.* — Fossil.

Very like the genus *Cardita.*



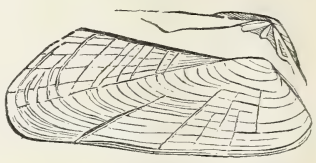
Megalodon cucullatus.

Family 14. — *CARDITACEA.*

The animal has the mantle lobes entirely separated, with the exception of a small portion which divides the opening from the breathing and other ducts; the foot compressed, with a byssus; the mouth has one lip tentacle on each side. The shell is free, regular, equivalve, inequilateral; the hinge has in each valve two unequal teeth, the lateral teeth present, or absent. Living in the sea in temperate and warm latitudes.

* Sowerby's Conch. Manual.

CARDITA. *Brug.* (Venericardia *Lam.*) — *Shell* equivalve, oblong, inequilateral, having in one valve two unequal teeth, one short and straight under the bosses, the other oblique, and in the other valve one thick, oblique, elongated tooth; valves more or less strongly ribbed or smooth, waved at the edge. *Animal*, having the mantle lobes entirely separated as far as a small united portion which divides the mantle cleft from a round hinder opening, which is the common opening for the egress of the water, &c., the mantle edge is without distinct cirrhi; the foot is compressed, triangular, wrinkled, with a byssus; the gills form on each side a pair, which run out behind, into a point by which they are fastened to the above-mentioned united part of the mantle, in front they are rounded, and the inner stretches farther than the outer. — 50 species*; also fossil.



Cardita.

Some species are said to attach themselves by a byssus to rocks. They are brought from Amboyna, New Holland, Africa, and the Northern Seas.

TRAPEZIUM. *Megerle.* (Libitina *Schum.*; Cypricardia *Lam.*)—*Shell* oblong, finely radiated from the summit to the base, equivalve, very inequilateral, bosses very near one end; three cardinal and one lateral tooth in each valve. *Animal* unknown. — 13 species†; also fossil.

Trapezium.

Found principally in masses of coral in St. Domingo,

* Reeve's Iconica. † Ibid.

and on the coasts of Guinea and New Holland. They bore into soft stones.

Opis. *Defrance.*—Like *Trigonia,* but having the bosses subspiral, with a large striated tooth on the hinge. — Many fossil species.

Myoconcha. *Sow.* — *Shell* oval, inequilateral, equivalve, oblique, umbones terminal; ventral margin rounded; hinge with an external ligament, and one oblique, elongated tooth in the left valve; impression of the mantle not sinuated.* — Fossil.

Family 15.—*SOLENOMYACEA.*

The animal has the mantle entire, with a third of the front cloven; behind a small circular opening beset with cirrhi for the gills and other ducts; somewhat beyond are a couple of cirrhi, which Deshayes erroneously took to be a second opening; the foot is cylindrical, when it protrudes it is truncated, disk-shaped, and there beset with papilli, when it is withdrawn the disk folds together; on each side is a single gill, formed like a feather of uprightly-placed, divided lamilla; the mouth is very small, without lip-feelers, instead, are found on each side of the base of the foot, two small sickle-shaped appendages. The shell is equivalve, linear, or cylindrical, inequilateral, rounded at each end, and gaping; with a thick brown glistening epidermis covering the shell in rayed stripes, and projecting beyond the edge; the bosses scarcely distinct, the hinge without teeth, an oblique rib bearing the inner ligament; two muscular, but no pallial impression.— Marine.

* Sowerby's Conch. Manual.

SOLENOMYA. *Lam.*—*Shell* and *animal* fully described in the account of the family.—4 species; also fossil.

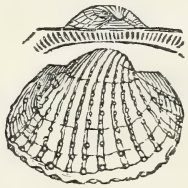
These curious shells are from New Zealand, New Holland, the United States, and the Mediterranean; found in the sand. The brown shining epidermis projecting beyond the edge, and there torn into strips, easily distinguishes this shell; the author has received good specimens from New Zealand.

Solenomya Mediterranea.

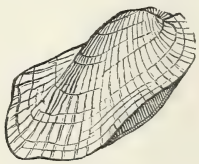
Family 16.—*ARCACEA.*

The animal has the edge of the mantle separated in its entire length; the gills are divided into clear, solitary, threads or filaments. The shell is mostly equivalve, inequilateral, covered with a scaly or hairy epidermis; the hinge has numerous teeth set in a row. They are found principally in the seas of the torrid zone.

ARCA. *Lin.*— *Shell* transverse, most frequently equi-



Arca granosa.



Arca Pacifica.

valve, more or less inequilateral, valves radiately ribbed, and some species gaping at the lower part; hinge straight; teeth small and very numerous; bosses prominent and distant, and often a little recurved; ligament external, and attached to the space between the bosses; an epidermis, which is often loose and rough; pallial impression

entire. *Animal* oblong; mantle freely open, simple or fringed; no siphons; foot large, oblong, bent, grooved throughout its entire length so as to form a disk, with plain or slightly crimped margins; a byssal gland at its base; byssus compact; mouth surrounded by labia formed out of the extremities of the branchiæ; no true palpi.* — 122 species†; also fossil.

Some of the species live in holes, or bury themselves in the sand, and others moor themselves by a byssus to stones, coral, and rocks; a few have one valve larger than the other, and many have a velvety or testaceous epidermis, frequently ending in a deep fringe at the margin. They are found in the Atlantic, Pacific, and Indian Oceans, and the Mediterranean. Macgillivray says, that on the coast of Australia, near Brisbane Water, he saw enormous accumulations of dead shells of *A. trepezizia*, which at first sight may be mistaken for raised beaches, these heaps being often twenty feet or more in depth, and several hundred yards in length, covered with a stratum of earth, and large trees growing on them. The shells had for ages constituted the principal food of the natives, who were formerly very numerous.‡ The *Arca Noæ*, or Noah's Ark, and several other species like it, in form and character, are well known to the collector; they are amongst the most striking of the genus. Also *A. tortuosa* and *semitorta*, which, as their names denote, are curiously twisted. Two or three small species are found on our coasts.

Byssoarca of Swainson, is a sub-genus.

CUCULLÆA. *Lam.* — *Shell* equivalve, inequilateral; bosses not touching each other; muscular impression

* Forbes's British Moll.

† Reeve's Iconica.

‡ Voyage of the "Rattlesnake."

forming a partly detached shelly plate within; hinge straight, with a row of small teeth; ligament external. *Animal* unknown. — 2 species; also fossil.

Cucullæa.

This shell greatly resembles the *Arca:* the species are found in the sand in the Indian Ocean; the colour of one is a deep cinnamon brown externally, and brown tinged with violet internally. They are easily distinguished by the curious shelly plate for the attachment of the anterior muscle.

SCAPHULA. *Benson.* (Scaphura *Gray.*)—*Shell* hardly to be distinguished from *Arca* or *Cucullæa*. *Animal* unknown.

ORTHONOTA. *Conrad.*—*Shell* equivalve, almost cylindrical, bosses turned far towards the front; the hinge edge straight-lined; the lower edge parallel to it; numerous notches in the hinge. 2 fossil species.

PECTUNCULUS. *Lam.*— *Shell* nearly round, equivalve, almost equilateral; hinge curve, with a line of teeth diverging on each side, those in the middle being some times incompletely formed; ligament external, epidermis hairy, muscular impressions very deep, pallial entire. *Animal* orbicular, its mantle freely open, with simple margins which are somewhat enlarged in the branchial and anal regions; foot large, semilunar, deeply grooved so as to form a disk with undulated edges; no bys-

Pectunculus glycimeris.

sus; lips formed of a linear prolongation of the branchial laminæ. — 52 species *; also fossil.

The *Pectunculus* is found in the West Indies, Atlantic Ocean, and Mediterranean, where it lives on the sandy or muddy coasts, and moves by means of its foot. Many of the species have a soft downy epidermis, but no byssus. *P. glycimeris* is the British species. The fossil species are numerous, and some occur in immense numbers, Dr. Mantell says that in the limestone at Bognor he has seen fifty specimens lying in relief on an area of a foot square.†

Limopsis. *Sassi.* (Trigonocælia *Nyst.*) — *Shell* separated from *Pectunculus* because the hinge plate has a separate triangular pit, the point reaching up to the boss, for the ligament. *Animal* unknown. — Few species; also fossil.

The living species are not much known.

Family 17. — *NUCULACEA.*

The animal has the mantle either entirely open, or closed behind and prolonged into two short, or long siphons; gills leaf-shaped; the mouth tentacles very large, and placed very backward; foot large, the basal surface can often be folded together; no byssus. The shell is triangular, or transverse; the small bosses touching, with no flat space as in *Arca;* the hinge linear, forming an angle, and beset with numerous pointed teeth; ligament internal. — Marine; found in most seas.

Nucula. *Lam.* (Polydonta *Megerle.*) — *Shell* varying in shape, equivalve, inequilateral; teeth small, numerous,

* Reeve's Iconica. † Medals of Creation.

a large spoon-shaped one in the middle; hinge curved or straight; bosses contiguous and curved; ligament partly internal; epidermis green, or dark olive brown. *Animal*, subtriagonal, its mantle freely open, without siphonal tubes, and with plain edges; foot deeply grooved, and forming an ovate pedunculated disk with serrated edges; one, in each pair of labial palpi long, curled, linear, and fimbriated at its margins; the other short and filiform.* — 34 species †; also fossil.

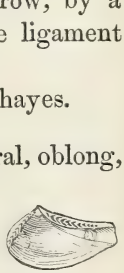
Nucula nucleus.

The localities of this genus are the Baltic and Mediterranean, the Indian Seas, the English Channel, &c., where they are met with on the sand and mud, either on the open coast or at the mouth of rivers. The shell is generally pearly inside.

NUCULINA. *D'Orb.* — *Shell* distinguished from the former genus by the few teeth in a single row, by a Cardium-like side tooth, and by the perceptible ligament below the boss. *Animal* unknown.

The only known species is *N. miliaris* of Deshayes.

LEDA. *Schum.*—*Shell* equivalve, inequilateral, oblong, produced posteriorly, closed, smooth, or concentrically striated, invested by an epidermis; margins smooth; beaks approximated incurved; inside more or less nacrous; hinge line angulated, and formed as well as the ligament like *Nucula;* pallial impression with a sinus. *Animal* oblong, mantle open in front, with simple, or fimbriated margins, furnished posteriorly with two partially united,



Leda caudata.

* Forbes's British Moll. † Sowerby's Thesaurus.

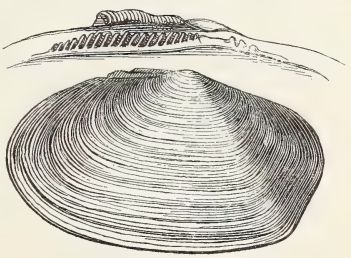
slender, unequal siphonal tubes; foot and palpi like those of *Nucula.** — Several species.

Two British species, *L. caudata* and *pygmæa*, are delicate, rostrated shells of small size; they are found also on the shores of northern countries.

YOLDIA. *Moeller.* — *Shell* transversely oval, often lengthened, thin, fragile, with a smooth, polished epidermis; gaping at both ends, more behind than before, the margins smooth; the pallial impression with a sinus behind. *Animal* with the mantle entirely open before, behind lengthened into two long, curved tubes, ciliated at their edges; foot large and strong. — 1 species; also fossil.

Y. (Nucula), *arctica* of Gray, is the recent species.

MALLETIA. *Desmoulins.* (Solenella *Sow.*; Ctenoconcha *Gray.*)—*Shell* longitudinally oval, equivalve, nearly equilateral, compressed, shining, covered with a thin, olive green epidermis; no cardinal teeth, and in each valve only three or four very small anterior lateral teeth, the posterior lateral teeth numerous, small, and sharp pointed, fitting into those of the opposite valve; a large sinus in the mantle. *Animal* (according to D'Orb.) having the mantle open in its whole length, behind prolonged into two separate tubes; the gills like two lateral bands; the mouth tentacles long, pointed; foot compressed, broad, capable of being enlarged at the end. — 1 species.



Malletia Norrissii.

Mr. Cuming brought *M. Norrisii* from Valparaiso.

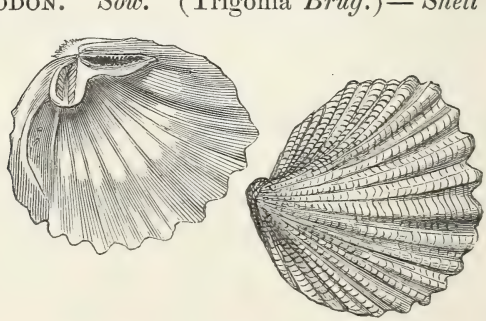
* Forbes's British Moll.

LYRODESMA. *Conrad.*—*Shell* equivalve, inequilateral, hinge with about eight diverging cardinal teeth; the upper surface obliquely striated. Fossil.

Family 18. — *TRIGONIACEA.*

The animal has the mantle divided for three-fourths of its circumference, and fringed at the edges; behind, there are two simple openings and no siphons; the foot is large, strong, hatchet-shaped, bent backwards, serrated at the edges, and at the side for one-third part laciniated; the gills are free, large, almost triangular, with double lamellæ; the mouth feelers are very small, and in part of their length joined together. The shell is equivalve, inequilateral, varying from triangular to nearly circular; the inside iridescent; in the right valve two large compressed, diverging, furrowed teeth, which lock into four in the other valve, the latter being only furrowed on the inner side; two simple muscular, and one simple pallial impression. — Marine.

LYRODON. *Sow.* (Trigonia *Brug.*) — *Shell* and *Animal* described in the account of the family. — 1 species; and many fossil.



Lyrodon pectenata.

The only recent species, *T. pectenata*, which is found in the deep seas of New Holland and New Zealand, was formerly so rare that even an odd valve has been sold at a high price. The interior is lined with highly iridescent mother of pearl, tinged with purple and gold colour. The animal has a strong muscular foot, for when Mr. S. Stutchbury was procuring some specimens in their native seas, he laid them in the boat, when they leaped over the side, and regained their freedom; a few minutes more and these lively animals would have been placed in spirits to preserve them as specimens.

Fossil remains of this genus are very numerous. Dr. Mantell says the shores near Boulogne harbour are strewn with them.*

Schizodus. *King.* — *Shell* equivalve, inequilateral; each valve with two small teeth close to the boss, those of the left placed before those of the right, the hinder tooth of the left valve is on its free side more or less cloven, and locks in with the two teeth of the right valve. — Fossil.

The type is *Axinus obscurus* of Sowerby.

Family 19. — *UNIONACEA.*

The animal has the mantle entirely cloven, sometimes, however, prolonged into two short siphons; the foot is generally compressed, and tongue-shaped. The shell is always regular, equivalve, iridescent, covered with a strong, smooth, firm, adhering epidermis; the hinge is variously formed, the ligament is always external; the muscular impressions are two, the anterior of which is

* Medals of Creation.

divided into several; the pallial simple. Fluviatile; particularly abundant in North America, but not extending to the Polar regions.

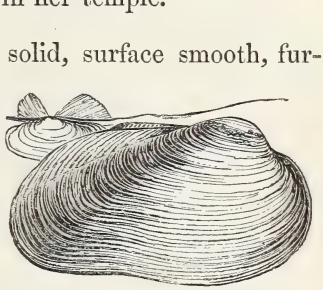
The shells of this family (like all others which are lined with what is called mother-of-pearl) are sometimes found to contain pearls of a good quality, and in large numbers, as many as sixteen having been taken from one shell. The Esk and Conway are celebrated for them. Sir Richard Wynn, chamberlain to Catherine, queen of Charles II., is said to have presented her majesty with a Conway pearl, which is to this day honoured with a place in the regal crown. Some of the Scotch rivers have produced numerous specimens of large and beautiful pearls, which have borne a high price. A paper in the *Philosophical Transactions for* 1693 gives a curious account of the fishery for these pearls in the river Omagh, county Tyrone, Ireland. "The poor people," the writer says, "in the summer months go into the water, and some with their toes, some with wooden tongs, and some by putting a sharpened stick into the opening of the shell, take them up; and although, by a common estimate, not above one shell in a hundred may have a pearl, and of these pearls not above one in a hundred be tolerably clear, yet a vast number of fair merchantable pearls are offered for sale by these people every summer assizes. Some gentlemen of the country make good advantage thereof, and myself heard that a miller took out a pearl which he sold for 4*l.* 10*s.* to a man that sold it for 10*l.*; the last purchaser sold it to the late Lady Glenlealy for 30*l.*, with whom I saw it in a necklace: she refused 80*l.* for it from the late Duchess of Ormond."

Between the years 1761 and 1764 the pearls found in the mussels of the river Tay were worth 10,000*l.* It is

not uncommon now to find pearls which are sold for one or even two pounds.

In ancient times Britain was celebrated for pearls, and Suetonius says that Julius Cæsar was induced to visit England to obtain them; he only obtained enough, however, to cover a buckler, which he afterwards dedicated to Venus Genetrix, and hung up in her temple.

Unio. *Retz.* — *Shell* thick, solid, surface smooth, furrowed, or nodulous; transverse, equivalve, inequilateral; bosses prominent and eroded; teeth grooved, solid, short, and oblique; ligament external; the posterior muscular impression is always compound; pallial simple.



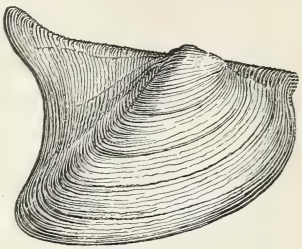
Unio.

Animal, shaped like the shell, thick, mantle freely open, anteriorly with simple edges; branchial region fringed with numerous cirrhi, anal, tube-like, plain; foot large, broad, and compressed; labial palpi ovate.* — 200 species; also a few fossil.

The *Unio* is found in the rivers of Europe, both the Indies, and elsewhere, particularly in North America, where they seem to swarm. Three species are British. The animals are eaten in Europe, often roasted in the shell. They are called the fresh-water mussel: they bury themselves in the sand or mud, with the bosses undermost, and sometimes produce tolerably large pearls; the valves in some species are not quite closed, and they are often highly iridescent within, sometimes white, at others pink or purple: the colour, however, varies.

* Forbes's British Moll.

PAXYODON. *Schum.* (Hyria *Lam.*) — *Shell* equivalve, obliquely triangular; hinge margin straight, both extremities elevated and winged; cardinal tooth long, and divided into many parts, lateral tooth long; ligament external. *Animal* (according to Gray) has the mantle lobe joined behind, and two, short, double contractile siphons, like *Iridina*, but agreeing otherwise with *Unio*. — 2 species.



Paxyodon corrugata.

Found in exotic lakes, covered with an olive-coloured epidermis, and pearly within.

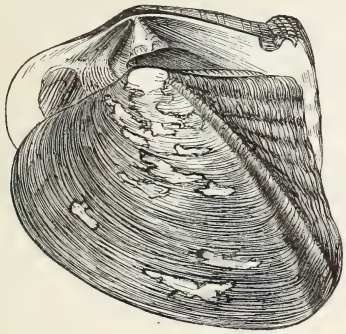
CASTALIA. *Lam.* (Tetraplodon *Spix.*) — *Shell* equivalve, inequilateral, triangular, with the bosses eroded; hinge with two laminar transversely striated teeth, one is posterior, distant from the bosses, short and divided; the other anterior, long; epidermis thick; interior pearly. *Animal* unknown. — 4 or 5 species.

Castalia.

Lamarck says these shells are intermediate between *Trigonia* and *Unio;* they are found in the rivers of Brazil, Paraguay, &c. &c.

MONOCONDYLÆA. *D'Orb.* — *Shell* equivalve, inequilateral, subrotund, or angulated; hinge consisting of a

large, obtuse, round cardinal tooth to each valve, with no lateral teeth.* *Animal* unknown. — Several species.



Monocondylæa.

Found in rivers of South America.

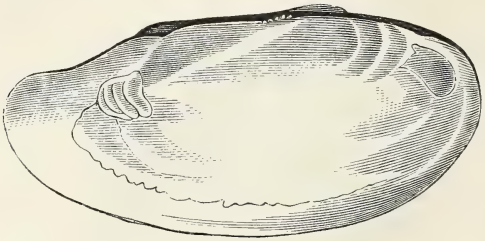
MARGARITANA. *Schum.* (Alasmodonta *Say.*) — *Shell* separated from *Unio,* as there is but one single side tooth in each valve, or it is even entirely wanting; in other particulars the same. *Animal* almost exactly like Unio. — Many species.

A considerable number of species are found in North America, to which belongs the fresh water pearl mussel (*Unio margaritifera*), which in some countries of Northern Europe occasionally contains very good pearls.

ANODONTA. *Cuvier.* — *Shell* generally thin, equivalve, inequilateral; hinge straight, with either no teeth or mere rudiments; shell transverse; ligament external. *Animal* oblong; mantle freely open, with simple margins in front and anteriorly, but fringed with numerous short cirrhi in the branchial region, plain in the anal; foot, large, broad,

* Sowerby's Conch. Manual.

compressed; labial palpi large, lanceolate.* — Numerous species; also fossil.

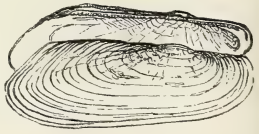


Anodonta cygnea.

These shells lie buried in the sand or mud of lakes and ponds, and are found distributed in every quarter of the world; the valves are thin, large, pearly, and covered with an epidermis; from their shape and lightness they are used in France for skimming milk. *A. cygnea* is British.

Mr. Lea of Philadelphia, who has studied this family with great attention, says that there are as many as six hundred thousand young *Anodontas* often present in a single adult specimen. Dipsas of Leach is a sub genus.

Iridina. *Lam.* — *Shell* very iridescent; equivalve, inequilateral; hinge very long; teeth small, like little tubercles, and numerous; ligament external, long and marginal. *Animal,* mantle closed behind and lengthened into two, unequal, very short tubes; the other parts of the body like the animal of the *Anodonta.* — 4 or 5 species.



Iridina elongata.

Iridina exotica is found in the rivers of warm climates, the Nile, and other African rivers; the shell is rather

* Forbes's British Moll.

thick, very brilliant inside, and of a red cast; it is coated with a thick, dark, olive-green epidermis, under which the shell is white, but dull. Caillaud says that the natives of Egypt use the valves in preparing flax, and as spoons in measuring oil, butter, and different kinds of provisions.

Mycetopus. *D'Orb.* — *Shell* thin, transverse, equivalve, nearly equilateral, of a long cylindrical form, gaping at both ends, more particularly at the anterior; covered with a dark olivaceous epidermis, somewhat rubbed off towards the umbones, and the interior is lined with a slight nacre; the umbones are central, and turned directly inwards to each other; the hinge is linear, straight, and without teeth, furnished with a thin marginal ligament; the muscular points of attachment are rather indistinct, being but faintly impressed, the anterior one is compound.* *Animal* having the mantle cloven its whole length, without projecting siphons, but with a separate anal opening; foot very long, and cylindrical, projecting out at the point, which cannot be bent back into the shell; a large mouth opening, lengthened tentacles, and very large gills. — 2 species.

Mycetopus solenoides.

M. (Anodon) *siliquosus*, of Spix, and *M. soleniformis*, of D'Orbigny, are found in the rivers of South America.

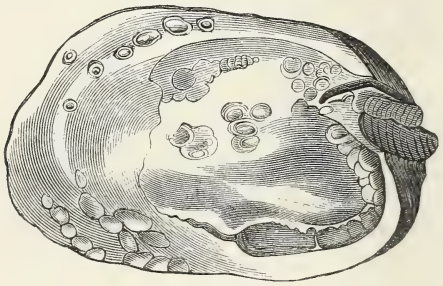
Family 20. — *ÆTHERIACEA.*

The animal has both the mantle lobes separated; on each side two dissimilar, striped, leaf-shaped gills, which under the end of the foot are connected together, so that they

* Reeve's Conch. Syst.

form with the mantle a blind canal into which the anal duct opens; on each side of the mouth are a pair of semicircular, labial feelers; the foot is large, rather thick, long, and oblique. The shell is somewhat like an oyster, irregular, attached, inequivalve, lamellated, slightly iridescent, with small bosses; the hinge is without teeth, somewhat undulating, and bulging, dissimilar in the two valves; the ligament is visible exteriorly, but penetrates into the interior. — Fluviatile.

ETHERIA. *Lam.* — *Shell* and animal described in the account of the family. — 3 or 4 species.



Etheria.

This genus is found in the rivers of Africa and Madagascar, and is abundant in the Nile above the Cataracts, where the inhabitants collect them, for the purposes of ornamenting their tombs with the shells, and feeding upon the animal. They are pearly within, foliaceous on the outside, large, and fix themselves by the under valve often to one another, presenting the most curious distortions of form. The interior of the valves is often of a vivid green colour, and raised in small blisters, which are said to be formed by the accidental introduction of small particles of sand during the formation of the nacrous fluid.

Order II.

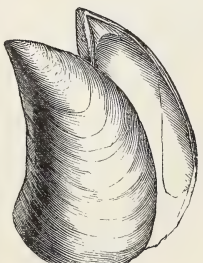
HETEROMYARIA.

The shells of this order have two adductor muscles, and therefore two muscular impressions, but they are at very unequal distances from the edge.

Family 1. — *MYTILACEA.*

The animal has the mantle almost entirely cloven (with the exception of *Dreyssena*) as far as the hinder part, where a small tube is formed; the mouth is tolerably large, and has two pointed tentacles which are partly joined; the foot is thin, cylindrical, and has a byssus behind at the base; the two gills are generally tolerably similar; the adductor muscles are very unequal, the foremost one is so small that it may easily be overlooked. The shell varies from triangular to oval, equivalve, closed, covered with a thick epidermis; the ligament is linear, almost internal. Natives of all zones, generally marine, but some are found in fresh waters.

Mytilus. *Lin.*—*Shell* longitudinal, equivalve, ham-shaped, somewhat triangular, bosses placed at the extreme end, hinge mostly without true teeth; ligament linear, internal; attached by a byssus, and covered by an epidermis. *Animal* oblong, its mantle freely open, in the ventral and branchial regions; ventral margin simple, branchial furnished with pinnated fringes; anal



Mytilus edulis.

opening plain and sessile; adductor muscles unequal; foot narrow, ligulate; furnished with a byssal groove.* — Many species; also fossil.

The *Mytilus* or *Mussel* is found in most parts of the world, and is abundant on rocky coasts, where it is attached by its byssus, so as to be covered by water at high tide; an instance is known of a lobster having been found covered with them; when the shell of the common English species, the *Mytilus edulis*, is freed from its epidermis and polished, it is of a beautiful deep purple colour. The animal is much sought after as an article of food, and, although not equal to the oyster, makes a palatable dish; but care is necessary, as it is often unwholesome, and sometimes even fatal. They are used extensively as a bait by fishermen, and Mr. Forbes relates that in one district alone, about the Frith of Forth, it is calculated that thirty or forty millions of mussels are used as bait in one year. The beds are private property, and are called "mussel gardens."

"A mussel sent from Australia to Mr. Gray lived 498 days after it was taken out of the water, and in the interim had been only twice for a few hours in water to see if it were alive."† Small seed pearls are sometimes found in the mussel, and are sold by those who procure them, for about 2*s.* per ounce, but it seems not to be exactly ascertained for what they are used.

MODIOLA. *Lam.* — *Shell* rather transverse, equivalve, inequilateral; bosses prominent, and slightly removed from the end, anterior side very short; valves gaping a little; no teeth; ligament almost internal; an epidermis, which is usually filamentous.

Modiola tulipa.

* Forbes's British Moll. † Woodward.

Animal oblong, margins of mantle in all parts simple, closed only to form a short, and more or less perfect tube in the anal region; foot cylindrical, with a more or less cylindrical byssal gland at its base; branchiæ elongate; labial palpi triangular and pointed.* — Many species; also fossil.

Attached by a byssus to the rocks of which they sometimes almost cover the surface; the byssus is very strong, and several of the species construct a sort of enveloping nest from it. This has been observed by Mr. Forbes.

Modiolaria. *Beck.* (Lanistes *Sow.*)—*Shell* rather oval, with radiating furrows at both ends, otherwise not essentially different from *Modiola*. *Animal*, with the mantle cloven the greater part of its length, behind produced into a short tube, before which the mantle edge stretches out into the form of a round lobe; the foot is worm-shaped, as long as the shell, and forms a delicate white byssus. — Several species; also fossil.

The greater number of the species live in the European and Northern seas; sometimes found in the mantle of the *Ascidia*, or in a web, formed by the byssus.

Crenella. *Brown.* (Myoparo *Lea.*)—*Shell* equivalve, very inequilateral, tumid or compressed; surface covered with an epidermis, and either entirely or partially ornamented by striæ, radiating usually in two diverging fasciculi from the beak; hinge margin toothless, generally crenulated; ligament linear, internal; two unequal muscular scars, pallial impression obscure. *Animal*, oblong, its mantle closed anteriorly, open in front and in the branchial regions, where the margins though

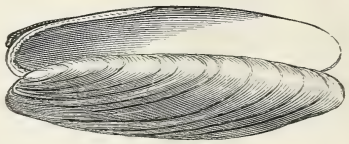
Crenella marmorata.

* Forbes's British Moll.

not united to form a siphon, constitute pouting, and more or less puckered branchial lips; formed into a true and produced tube anally; adductor muscles unequal; foot narrow, ligulate, furnished with a byssal groove.*—Several species; also fossil.

Elegant little shells, usually boring into the skins of tunicated Mollusca; they are found in the European seas, and about six on the English shores; the author has received several fine specimens from New Zealand, seemingly identical with the English species *C. marmorata.*

LITHOPHAGUS. *Megerle von Muehlfeld.* (Lithodomus, *Cuv.*)— *Shell* transverse, cylindrically oblong, equivalve, and covered with a brown epidermis; extremities round; bosses scarcely prominent; the hinge straight; ligament mostly internal. *Animal,* not differing materially from *Mytilus,* but in maturity, it has no byssus.—About 12 species; also fossil.



Lithophagus dactylus.

The *Lithophagus,* when young, suspends itself to rocks by a byssus†, but, as it grows, it pierces a hole, and introduces itself, forming a cavity which thenceforward it never leaves: indeed, after a short time, as it merely enlarges the interior, without making the entrance any wider, its increasing bulk renders it unable to quit its cell, and in these circumstances its byssus, being no longer necessary, dies away. It is common in the Mediterranean and the Antilles, where it often pierces other shells.

DREYSSENA. *Van Beneden.* (Tichogonia *Rossm.;* Con-

* Forbes's British Moll.

† This assertion is from Cuvier; Sowerby thinks it has no byssus.

geria *Partsch;* Mytilina *Cant.*) — *Shell* equivalve, very inequilateral, subtriangular, tumid, surface covered with an epidermis; beaks terminal, furnished internally with a transverse shelf or partition; hinge composed of an imperfectly developed cardinal tooth in the right valve, and a corresponding socket in the left; ligament linear, internal; three muscular impressions, pallial impression obscure. *Animal,* oblong, its mantle closed, excepting a passage for the foot, and the two siphonal orifices; branchial opening prolonged into a tube, with a circular fringed orifice; anal opening plain, and subsessile; foot short, ligulate, with a conspicuous byssal groove.* — About 6 species; also fossil.

Dreyssina polymorphus.

This shell is found in the rivers of Europe, also in the Caspian and Black Seas, and has become abundant also in this country, probably brought from some of the above-mentioned places, adhering by its byssus to the bottoms of vessels. It was first found in the Commercial Docks in 1824. They are often found attached to each other in great numbers, either in fresh or brackish water. The peculiar triangular form, the dark zigzag markings upon a light ground, and yellowish epidermis, make these shells easily distinguished. They were formerly called *Mytilus polymorphus.*

Mytilimeria. *Conrad.* — *Shell* equivalve, tolerably oval, thin, the bosses somewhat rolled inwards; the hinge is toothless, with a shallow hole under the bosses; the pallial impression with a broad blunt sinus. *Animal,* unknown. — 1 species.

Found on the coast of California, attached to sea-weed roots.

* Forbes's British Moll.

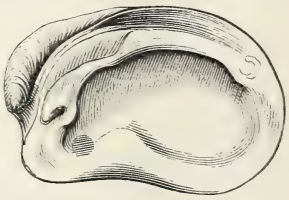
Byssanodonta. *D'Orb.* — *Shell* roundish, oval, thin, equivalve, closed; the pallial impression entire; two muscular impressions, the front one small, transverse, not lobed, and the larger under one more oblique; a linear outer ligament; hinge toothless. *Animal*, having an open mantle, and a rudimentary foot with a byssus. — 1 species.

B. Paranensis, a small shell, is from the rivers of Panama.

Modiolopsis. *Hall.* — *Shell* equivalve, inequilateral, lengthened, broader behind, the bosses lie near the front extremity; furnished with a single strong muscular impression like *Modiola* (*?*) often a sinus extending from the front side of the boss to the hinder, so that the front part is drawn into a kind of lobe. — 16 species, fossil.

The shell is thin, and the surface has fine concentric striæ.

Hippopodium. *Conybeare.* — *Shell* equivalve, obliquely transverse, heavy, deep, inequilateral, umbones incurved; ventral margin sinuated so as to give a bilobed appearance to the shell; hinge incrassated with one rugged oblique tooth.* — Fossil.



Hippopodium ponderosum.

A large heavy fossil shell, with the bosses much incurved, and behind them a deep heart-shaped cavity.

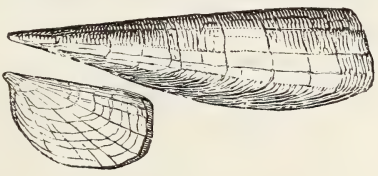
Family 2. — *PINNACEA.*

The mantle of the animal is entirely cloven, and there is no distinct tube behind; the edge is beset with cirrhi;

* Sowerby's Conch. Manual.

the foot is slender, conical, worm-shaped, and produces a silken kind of byssus; the mouth has two large lips, their inner surfaces beset with blisters; the mouth tentacles are short, and two on each side are united almost in their whole length; the gills are generally equal, and half-moon-shaped; near the anal opening in the mantle is a singular conical worm-shaped body, the use of which is doubtful; adductor muscles two, the front one is tolerably thick, and lies immediately under the bosses, the other is still thicker, rather cylindrical, and almost central. The substance of the shell consists of uprightly placed fibres on the inner surface; the ligament is linear, and occupies the whole back edge of the shell, and is almost internal. The Pinnacea prefer the seas of warm climates.

PINNA. *Lin.* — *Shell* equivalve, rather triangular, ham or wedge-shaped, very inequilateral; bosses terminal, the other extremity gaping; no teeth; hinge straight, with a long and somewhat internal ligament; shell thin and fragile. *Animal*, triangular, mantle freely open, no siphons; mantle margins with cirrhated edges; mouth with foliaceous lips, and short palpi; anus furnished with a long ligulate valve; foot small with a byssal groove; adductor muscles very unequal.* — About 20 species; also fossil.



Pinna.

The *Pinna* is usually found moored to the sand by its byssus, or Forbes says, lying "with their gaping extremity upwards, and their beaks plunged deep in the ground." It is common to nearly all seas, and grows to a

* Forbes's British Moll.

considerable size, some specimens being a foot and a half long; *P. pectenata* is found in our own seas on the coasts of Dorsetshire and Sussex. Pearls are occasionally found in the shell of the *Pinna*, but they are of an amber colour and of little value; sometimes a small species of crab takes up its abode inside, without prejudice to either party, and, as Forbes says, "many fables have been narrated of their friendship." Sowerby does not believe in the statement. A species found in the Mediterranean is much sought after by the inhabitants of Sicily and Calabria, not only as an article of food, but also for the sake of its byssus, which is long, fine, shining, and abundant: of this they fabricate a species of cloth, very remarkable for its warmth and softness, but which will not take any dye. In the British Museum there is a pair of gloves made of this material, in a case with some large specimens of the shell, and it is recorded in history, that Pope Benedict XV. had a pair of stockings presented to him in 1754 made of this material; they were enclosed in a very small box, and were extremely fine in texture.

PINNOGENA. *Saussure.* (Trichites *Lycett.*)— *Shell* free, narrow, lengthened, inequivalve, closed; the largest valve has coarse knobs on the surface, proceeding from the longitudinal ribs; the form of the hinge seems to be unknown. — Fossil.

This genus is, from the filamentous structure of the shell, very remarkable, and is only known in the fossil state.

Order III.

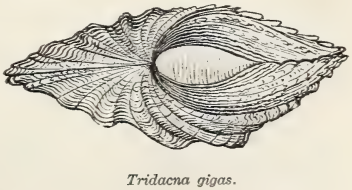
MONOMYARIA.

The animals have only one adductor muscle; the valves therefore have each only one muscular impression.

Family 1.—*TRIDACNACEA.*

The animal has a mantle which, as far as the three openings, is closed completely; the two lower and hinder openings serve for the egress of the water that has passed the gills, as well as for the anal duct; the third opening lies above close to the back of the bosses of the shell; the gills are long and narrow, the upper one much narrower than the under or inner one, and connected therewith almost its entire length; the mouth is oval, with two large narrow lips, at the end of which, on each side, are a pair of narrow, pointed labial tentacles. The shell is regular, equivalve; the hinge has under the boss two oblique, unequal teeth; the ligament is external at the edge; one muscular impression, two adductor muscles exist, but they are so very approximate that they appear but one. Found living in the Indian, Chinese, and South seas, growing to an enormous size.—Not known as fossils.

Tridacna. *Brug.* (Pelvis *Mergele v. Muhlf;* Hippopus *Gray.*)—The *shell* and *animal* are described in the family; the foot of the latter is thick, cylindrical, and bearing a byssus; the part of the mantle which surrounds the foot



Tridacna gigas.

opening, sometimes secretes unequal chalky pieces. — A few species.

These shells are brought from the Indian Ocean, where they attain so large a size that a single person can with difficulty carry one valve, and some, indeed, have been said to weigh 500 lbs. In Roman Catholic countries, the shells are sometimes used as receptacles for the holy water in the churches, and formerly they were considered sufficiently valuable to form a present to a monarch, those in the church of St. Sulpice at Paris having been presented to Francis the First by the republic of Venice. The animal is correspondingly large, and it has been stated that more than one hundred persons could make a meal upon that which inhabits the *Tridacna gigas:* this may be an exaggeration, but there is no doubt the architect of so extensive a dwelling must be exceedingly large.* The *Tridacna* adheres to the rocks by a stout and strong byssus with so much tenacity as to require the aid of a hatchet to separate it. A specimen of this shell, brought from Sumatra, is now in Arno's Vale, Ireland, and weighs 507 lbs., each valve being four feet six inches in length, and two feet five and a half inches in breadth. The interior of the shell is of an opaque white, and very beautiful.

Layard found one species of this genus in the ruins he visited in the East; he remarks: — "Amongst them," (the relics found at Wiorka in Mesopotamia) "and deserving particular notice, are the fragments of a shell (*Tridacna squamosa*) on which are engraved the heads of two horses, apparently part of a subject representing a warrior in his chariot. The outline upon them is not

* The valves are so large as probably to require centuries to complete their growth. Reeve's Conchologia Systematica.

without spirit; but they are principally remarkable for being almost identical with a similar engraved shell found in an Etruscan tomb, and now in the British Museum. This is not the only instance of relics from Assyria and Etruria being of the same character, showing a close connection between the two countries, either direct, or by mutual intercourse with some intermediate nation."

Hippopus. *Lam.* (Tridacna *Gray.*)—*Shell* equivalve, regular, inequilateral; valves closed, transverse, two compressed teeth in each valve; ligament external; shell imbricated with numerous tubercles. *Animal* similar to that of the *Tridacna*, except that the foot is small, and there is no byssus.—1 species.

Hippopus maculatus.

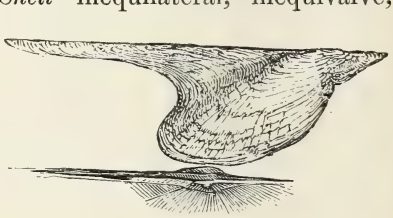
This handsome shell is not nearly so large as the *Tridacna*, and is common in collections, although there is but one species—*H. maculatus*, from the Indian Ocean. Sowerby justly remarks:—"The delicate whiteness of the interior, the undulating edges, the radiated fluted columns, adorned at intervals by crisped fringes, and the richness of the variegated colouring, are such as to secure the admiration of the most superficial observer."

Family 2.—*MALLEACEA.*

The animal is nearly united to the *Pinna*, but it has only one central fastening muscle. The other particulars are, that the two mantle lobes are separated in their whole

length, thickened at their edges, and beset with small tentacles: on each side are a pair of large, tolerably equal, half-moon-shaped gills, which are not connected with those on the side; the mouth is oval, and large, with two rather large lips, beset inside with fleshy lamillæ, which on each side extend beyond the lip tentacles; these are short, broad, and at their free ends obliquely truncated; the foot is small, worm-shaped, and bears a coarse byssus, the filaments of which in some, resemble those of the *Arca*, growing together in a mass. The shell is equivalve, wing or leaf-shaped, iridescent, the hinge edge forms a straight line, before and behind prolonged into ears; with a notch in the right valve for the passage of the byssus. The Malleacea live almost exclusively in the seas of the Torrid Zone, and in the early periods of the creation have been much more numerous than at present.

Avicula. *Brug.* — *Shell* inequilateral, inequivalve, transverse, irregular; hinge margin straight and much lengthened, ears unequal, no teeth, byssus large, passing through a notch in the valves; exterior foliaceous, inside of a brilliant pearly substance; muscular impressions two or more, one larger than the others; pallial entire. *Animal* shaped like the shell, its mantle freely open, with cirrhated margins; no siphons; foot small, cylindric, furnished with a byssal groove; palpi large; adductor muscles* very unequal, one being greatly larger than the rest.† — About 30 species; also fossil.



Avicula.

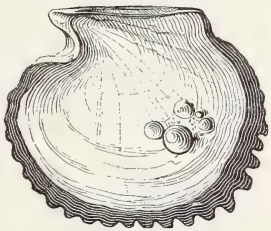
* Philippi considers these as one.

† Forbes's British Moll.

There are several beautiful species of the *Avicula* from the Indian Ocean, coast of Brazil, New Holland, the Red Sea, and from the Mediterranean. The valves are shaped like wings; the interior is pearly in the centre, but some species have a broad black border surrounding it, and the margin is often terminated in a fringe, occasioned either by the epidermis or the foliaceous texture of the exterior. The hinge and other iridescent parts of *A. Macroptera* are used for making ornaments (bijoux) called peacock's eyes.

The genus *Meleagrina* of Lamarck is now classed with *Avicula*, as the animals resemble each other.

The *A.* (Meleagrina) *Margaritifera*, or Pearl Oyster, is found chiefly in the Persian Gulf, and at Ceylon; it is lined with a pearly substance, which is formed by the animal in thin layers, and is imported into Europe in large quantities, for the purpose of making knife handles, buttons, &c., under the name of *mother-of-pearl.* If by any accident the inner surface of the shell is injured, so as to cause a fracture in the mother-of-pearl, the layers in that place become for the future irregular, and a lump is gradually formed, which from accidental circumstances is sometimes oval, sometimes globular, and sometimes pear-shaped. Pearls, as these lumps are called, are occasionally found loose in the shell, and in this case the pearly substance has been deposited upon a loose grain of sand, or diseased ovum or egg of the animal.



Avicula margaritifera.

" Pearls are small nacrous balls, that become formed and hardened within the body of the animal; they are found deposited in the most fleshy parts, particularly

within and around the adductor muscle, and are said to be occasioned by the overcharge of those glands whose function it is to secrete the nacrous fluid destined for the internal lining of the shell. When the animal is thus diseased, this beautiful iridescent fluid is very irregularly discharged, being also deposited upon the inner surface of the shell in little excrescences; these are often detached, and form articles of commerce as pearls of inferior value, the former being considered more precious, both on account of their rotundity of form and the clearness and beauty of their complexion."*

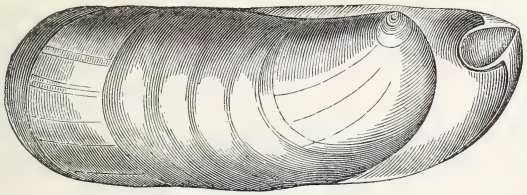
Excellent imitations of pearls are made with hollow glass globules, the inside of which is covered with a liquid called pearl essence, and then filled with white wax; the essence is composed of the silver-coloured particles which adhere to the scales of the Bleak fish, and was first applied to this purpose, by a Frenchman named Jacquin, early in the last century. The accounts of the pearl fishery are exceedingly interesting.

PTERINEA. *Goldfuss.* — *Shell* equivalve, transverse, with a long straight hinge edge on both sides, prolonged into an ear or wing, and on which the single ligament is fastened; there is also a notch for a byssus; hinge with teeth which diverge obliquely backwards, two muscular impressions, of which the hinder and larger one is irregularly three-sided, and placed entirely under the hind wing. — Fossil.

VULSELLA. *Lam.* — *Shell* longitudinal, tongue-shaped, nearly equivalve, irregular; bosses equal; hinge with a prominent callosity in each valve, having an impression, or arched pit for the ligament, which is also partly ex-

* Reeve's Conch. Syst.

ternal. *Animal* unknown; without byssus. — 6 species; also fossil.



Vulsella lingulata.

These shells are not attached, but are found buried in sponge in the Indian Ocean. They are iridescent within, and extremely irregular in form, so as to make it very difficult to distinguish the species.

Myalina. *Koninck.* — *Shell* equivalve, inequilateral, lengthened or oblique, with straight or slightly curved hinge margin, which is without teeth; the ligament is internal, and is received into a broad facet, having a great number of little furrows parallel to the hinge margin; bosses pointed, terminal, or extending forward, usually small, somewhat curved; and immediately under the same, in the interior, is a small plate like a partition, as in *Dreyssina;* muscular impressions doubtful. — Fossil.

Ambonychia. *Hall.* — *Shell* equivalve, inequilateral, compressed, winged behind, or slightly winged, at the front edge blunt and suddenly sloped, or curved downwards; the common form is somewhat obliquely oval, swelled out towards the bosses; the hinge border is very oblique, approaching to a line which runs in the direction of the curved bosses; the upper surface has raised concentric stripes, strong undulations or fine rayed lines; the muscular impression is large. — Fossil.

Posydonomya. *Bronn.* — *Shell* equivalve, inequilateral, obliquely long, thin, outside, and internally concentrically wrinkled; hinge edge straight before and behind, with slightly projecting knobs, and having no notch. — Fossil.

Malleus. *Lam.* (Tudes *Oken.*; Himantopoda *Schum.*) — *Shell* irregular, variously distorted, nearly equivalve: hinge margin generally very long, extended out into two

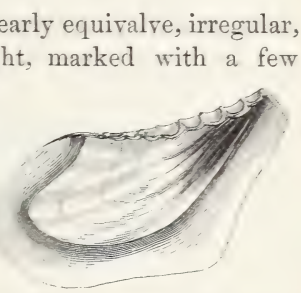
Malleus vulgaris.

ears; no teeth, but a conical pit under the boss, which contains part of the ligament; an oblique notch for the passage of the byssus, near the boss. *Animal* unknown. — 6 species.

The *Malleus* is a native of the Indian Ocean: it attaches itself by a byssus to submarine rocks. The form of these shells is so very various, that scarcely two of a species can be found alike, the rarity of some causing them to be very valuable, and much sought after. Ex-

ternally the appearance is very rude and irregular; but, on the other hand, the interior is exceedingly beautiful, being lined with the most brilliant mother-of-pearl.

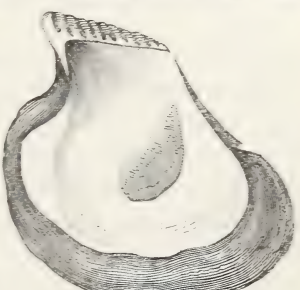
CRENATULA. *Lam.*—*Shell* nearly equivalve, irregular, foliated, flattened; hinge straight, marked with a few semicircular excavations which contain the ligament; no distinct opening for the byssus. *Animal* unknown.—Few species.



Crenatula.

This shell, which is thin and fragile, is lodged in sponges, and is brought from India and Australia. The byssus has not been seen, and therefore it is not positively ascertained whether it possesses one; there is no passage for it as in the next genus. The pearly portion of the interior of the valves is very iridescent, but scarcely covering half the shell.

MELINA. *Retz.* (Perna *Brug.;* Sutura *Megerle* and *Muhlf.;* Hippochæta *Sangiovanni.*)—*Shell* nearly equivalve and flat, irregular, with an opening for the passage of the byssus; bosses small; margins very brittle; hinge straight and broad, with parallel grooves for the ligament. *Animal,* with the mantle entirely cloven; the foot similar to *Avicula,* and bearing a coarse byssus.—Few species; also fossil.

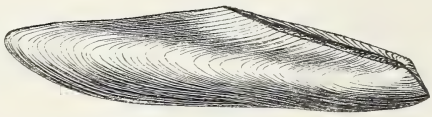


Melina ephippium.

From India, the Cape de Verde Islands, &c.; generally found moored to rocks deep in the sea, and occasionally

to mangrove trees. Considerable clusters are frequently found attached firmly to each other by the byssus.

GERVILLIA. *Defrance.* — *Shell* inequivalve, inequilateral, oblong, oblique, much elongated; hinge long,

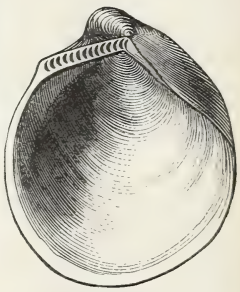


Gervillia.

straight, having small, irregular, transverse, ligamentary pits.* — Fossil.

In general form resembling *Avicula.*

CATILLUS. *Brongn.* (Inoceramus *Sow.*) — *Shell* thick, inequivalve, subequilateral, triangular, deep, with the umbones incurved; hinge formed of a series of transverse grooves.* — Fossil.



Catillus.

INOCERAMUS. *Parkinson.* — *Shell* free, more or less inequilateral, irregular; hinge a marginal, subcylindrical, transversely sulcated callus, supporting a ligament; beaks conspicuous, at one end of the hinge.† — Fossil.

Sowerby depicts several species in his "Mineral Conchology," some of very large size, which are common in chalk. Dr. Mantell says, these shells vary in size from an inch to three or four feet in diameter. The specimens

* Sowerby's Conch. Manual. † Sowerby's Mineral Conch.

readily break to pieces from the vertical arrangement of the fibres, and it is supposed they were equally brittle when recent.

PULVINITES. *Defrance.* — *Shell* subequivalve, inequilateral, compressed, thin, slightly gaping posteriorly; one valve flat, the other rather concave; hinge linear, short, divided into perpendicular grooves; muscular impressions two*, one subcentral, the other above it near the hinge.† —Fossil.

Very like Melina (*Perna*), the only species is *P. Adansonii.*

PACHYMYA. *Sow.* — *Shell* obliquely elongated, equivalve, thick, sub-bilobed, with beaks near the anterior extremity; ligament partly immersed, attached to prominent fulcra.†—Fossil.

Shaped like *Modiola;* a large heavy fossil shell from Lyme Regis, called *P. gigas.*

Family 3.—*PECTINACEA.*

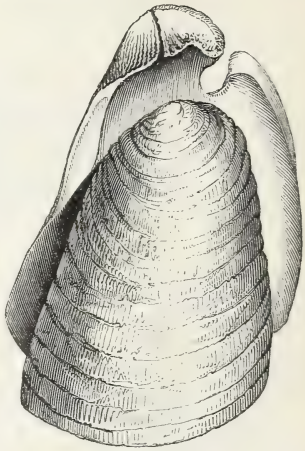
These animals have a foot, though it is sometimes little developed; most of them have a byssus; the mantle lobes are completely separated, and the edge furnished with numerous tentacula and eyes. The shell is mostly in equivalve, but regular, not foliaceous, but porcellaneous; with two ears at the hinge, which is straight, with or without teeth, and the ligament is in a triangular pit, or in a channel which extends to the bosses. Found in the sea in all zones.

PEDUM. *Brug.*—*Shell* irregular, longitudinal, or hatchet-

* Philippi says they are unknown.

† Sowerby's Conch. Manual.

shaped, inequivalve, and slightly eared; a groove or pit in each valve, which increases in size with age, and bears the ligament; bosses unequal and distant, the lower valve rather convex, with the sides reflected over, upper valve flattish; a large yellow byssus passes through a sinus in the shell. *Animal* greatly resembling the *Pecten;* the mantle cloven in its whole length, the edge thickened, furnished with several rows of cirrhi, and having eyes; two pair of large leaf-shaped gills on each side; the foot is vermiform, and has at its base a thick glossy silken byssus; the mouth is pretty large, oval, having on each side a pair of striped triangular tentacula. — 1 species.

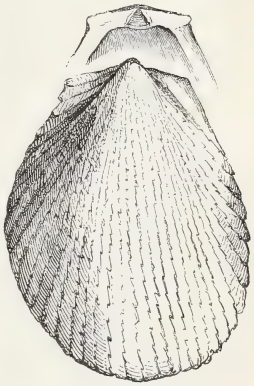


Pedum.

The only species known (*P. spondyloideum*) is found in the Indian Seas, at great depths, and is rare; it is white, slightly tinged with purple near the bosses; and buries itself partially in madrepores, in crevices of its own boring.

Lima. *Brug.* — *Shell* longitudinal, nearly equivalve, obliquely fan-shaped, slightly eared; surface smooth, or striated; valves gaping near the bosses, which are distant, separated by an area; hinge without teeth but having a triangular pit for the ligament; byssus passing through a wide sinus. *Animal,* oval; mantle freely open, its margins pendent and fringed with long tentacular filaments: ocelli absent or inconspicuous; no siphons; body produced, in part

linguiform: foot small, ligulate, furnished with a byssal groove; labial palpi subtriangular, small, pectinated; mouth surrounded by tentacular filaments: anal tube cylindrical, externally visible; branchial leaflets equal on each side.* — 13 species †: also fossil.



Lima.

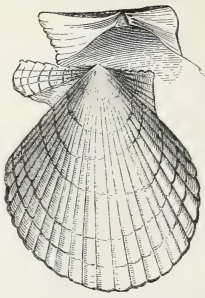
The *Lima* is almost always white, or very light coloured; some of the species are rare; three are found on our own coasts, the others in America, the Isle of France, &c.; they have a brown horny epidermis. Sowerby says that "the animal makes use of the valves of its shell for swimming, working them like fins or paddles, and by this means proceeding at a rapid rate through the waters." Forbes gives a beautiful figure of the animal of *L. hians* in his work on British Mollusca; the tentacular filaments, of a dark orange colour, project from the edges of the shell, like a loose fringe all round, and the animal within is red, whilst the valves are white, or nearly so.

Limea. *Bronn.* (Limoarca *Münster.*) — *Shell* longitudinal, eared, closed; the outer area of the hinge is triangular, with a small triangular pit in the middle for the ligament; the hinge straight, having within, on each side, several perpendicular teeth: a straight muscular impression. — 1 species: also fossil.

The living species is *L. Sarsii* from the Norwegian seas.

* Forbes's British Moll. † Sowerby's Thesaurus.

PECTEN. *Müller.*— *Shell* regular, nearly round, eared, ribbed, or furrowed, nearly equilateral, inequivalve; ligament internal, inserted into a triangular groove; hinge margin straight; no teeth; bosses contiguous. *Animal*, shaped as the shell, mantle freely open, with pendent margins bearing (usually two) fringes of tentacular filaments, the one series at their fixed, the other at their free border; among the former are ranged globular shining ocelli; no siphonal tubes; body large, apiculate; foot small, cylindrical, with a byssal groove, from whence a weak byssus is spun, mostly when the animal is young; mouth surrounded by foliaceous leaflets, and two pair of labial tentacles, which are smooth externally, pectinated internally; branchial leaflets equal, each pair partially doubled on itself.*—176 species †; also fossil.



Pecten varius.

The animal of the *Pecten* has the power of making frequent and sudden contractions of its muscles, by which means it moves rapidly through the water; and it requires some agility to catch the shell, as it flutters amongst the corals where it dwells. Aristotle mentions their power of leaping, and this observation has since been confirmed. A basket, full of the common Pecten placed at the edge of the water has been spedily emptied, by the individuals springing from their confinement to their native element. M. Lesson immersed a basket of Pectens in the sea, the water coming to within six inches of its rim. The individuals, he says, which formed the superior layer, constrained in their movements by those that were beneath, after

* Forbes's British Moll. † Reeve's Iconica.

many efforts, succeeding in leaping from their prison. No sooner did they fall upon the water, than, by striking their valves rapidly together, they ran or rather skipped a few seconds upon the surface, and then sunk to the bottom. In this way all the contents of the basket disappeared within fifteen minutes. Some of the species are stout and heavy, others thin and transparent, and many are ornamented with beautiful colours.

The *Pecten* is found almost everywhere; on our south coasts it is abundant, and much used as an article of food. In some countries the shells of the *Pecten maximus* are used as plates by the poor; in Paris the restaurateurs employ them for the same purpose, when serving up a certain preparation of mushrooms; and in England they are employed in cooking scalloped oysters, and the shell is consequently known as the *scallop shell.* The *P. Jacobæus*, a Mediterranean shell, was formerly the badge of the pilgrims who had been to the Holy Land, and was worn on their caps and cloaks. There are nine species British, of which *P. varius*, *opercularis*, and *maximus* are the most common; they all vary greatly in colour, and are exceedingly pretty. Several beautiful species of fossil Pectens are figured in Sowerby's "Mineral Conchology."

Hinnites. *Defrance.* — *Shell* inequivalve, nearly equilateral, radiated; valves eared; the area of the hinge quadrangular, tripartite, its cartilage immersed in a deep longitudinal pit in the centre, the lateral portions striated, supporting the ligament; sinus for the byssus small; muscular impression large, connected with impressions remaining from the attachment of the mantle parallel to the margin of the valves.* — 2 species†; also fossil.

* Sowerby's Conch. Manual. † Reeve's Iconica.

These shells are irregular in form, free when young, but attached when old.

SPONDYLUS. *Lin.* (Podopsis *Lam.* Pachytos *Defrance;* Dianchora *Sow.*) — *Shell* eared, inequivalve, rough with spines or plaits; two strong teeth, uniting the valves closely; bosses unequal, that of the lower valve projecting into a broad triangular area; this valve is strongly attached to rocks and corals; ligament internal. *Animal* having the mantle completely cloven, the edges thick and furnished with several rows of tolerably long cirrhi, between which the eyes are placed, as in *Pecten* and *Pedum;* the mouth is surrounded with a large toothed lip, and has on each side a pair of tentacles in the form of myrtle leaves; the foot is of a singular form; on a short style is situated a disk, on the middle of which a cylindrical sinew is raised, ending in a small oval fleshy mass; the gills are large, leaf-shaped, or half-moon shaped, and not varying much in size. — 40 species*: also fossil.

Spondylus.

The *Spondylus* lives at great depths in the sea, and attaches itself to corals and rocks: it has often been found fixed to anchors, cannons, and other iron articles that have been for some time at the bottom of the sea. Many of the species are very beautiful, and of very vivid colours, such as bright red, pink and yellow, or orange. A fine collection of these beautiful shells forms at once a union of elegance and beauty hardly to be surpassed amongst the bivalves. They are found in the Indian Ocean, the Mediterranean, and on the American coasts.

* Sowerby's Thesaurus.

PLICATULA. *Lam.* (Harpax *Parkinson.*) — *Shell* irregularly ovate, inequivalve, one valve being more convex than the other, sides strongly and transversely grooved; ligament internal, between the teeth; bosses unequal. *Animal* unknown. — 7 species; also fossil.

Plicatula.

Attached by the under valve to stones and rocks. They are brought from the Indies, and the Philippines, and Sowerby says the grooved teeth lock so firmly into each other that the valves cannot be separated without breaking them.

SPHÆRA. *Sow.* — *Shell* globose, eared; with one central, and two (?) remote teeth about the hinge; ears obtuse, short, incurved; the line of the hinge is long, slightly curved, and terminated at one, perhaps at both ends, by a flat obscure tooth, beneath the commencement of the ear; in the centre of it is a large irregular tooth, transversely flattened and turned towards the incurved beak; the shell is thick, and very gibbose.* — Fossil.

Only 1 species known, *S. corrugata.*

Family 4. — *OSTRACEA.*

The animal has the mantle entirely cleft, with a thickly fringed edge; no distinct foot; large, curved, almost equal gills; two pair of lengthened lance-formed mouth tentacles. The shell is irregular, foliaceous; the under-valve mostly attached. The *Ostracea* are not found in the seas of the frigid zone.

OSTREA. *Lin.* — *Shell* inequivalve, irregular, substance foliaceous or in loose layers; bosses distant, and very un-

* Sowerby's Mineral Conch.

equal, that of the lower valve becoming very large with age and attached, upper valve flattened and smaller; no teeth, ligament nearly internal, lodged in a pit. *Animal* shaped like the shell, its mantle freely open, and without tubes, the edges double, and each bordered by short tentacular fringes; no conspicuous ocelli; branchial leaflets not doubled on themselves; labial appendages triangular, connected round the mouth by a plain membrane; foot obsolete.* —Many species: also fossil.

Ostrea edulis.

Oysters have been found in most parts of the world in abundance, although none have as yet been discovered in the polar regions: they are inhabitants of salt water only, and are always found on rocky ground, at no great depth from the shore, attached by the under valve. The oyster, and indeed all bivalves which adhere by the shell, are covered at their birth with a mucilaginous liquid which attaches them to the surface of any object on which they rest. The animal strengthens this first adhesion in the same manner that it increases the size of its shell. At the mouths of several American, African, and Indian rivers, great quantities of oysters are found attached to the roots of trees, and even to their branches, where they are so situated as to be covered by the tide. Mrs. Lee, in her "Stories of Strange Lands," says, "The flavour of the tree-oyster is delicious; they are small, and cover the lower branches of the mangroves. Two or three of these

* Forbes's British Moll.

branches form an ample luncheon, and in the river Gaboon we had a daily supply." In the British Museum there is a large specimen of a crab, to the back and claws of which a number of good-sized oysters have attached themselves. The author has a specimen in her cabinet formed of two young oysters, each about the size of a shilling, protruding like wings from the aperture of a periwinkle shell; they are very firmly attached, but still there is sufficient room for the play of the upper valves of both.

Oysters generally spawn in May, and their growth is tolerably rapid; three days after the deposition of the spawn, the shell of the young oyster may be seen nearly a quarter of an inch broad; in three months it is larger than a shilling, and in six months it exceeds a half-crown piece in size. Oysters have been used as food almost from time immemorial; the Greeks, but more especially the Romans, held them in great estimation, those from the Dardanelles, Venice, and England being considered the best. The English fishery is principally carried on at Wivenhoe, near Colchester, Feversham and Milton in Kent, in the Medway, and at Tenby in Wales. When the oyster is first taken out of the sea it has frequently a strong muddy taste, and it is therefore placed in what is called a preserve, which is a kind of tank dug in the sand near the sea, and communicating with it by a narrow passage; this place is frequently cleared of mud and dirt by letting the water run off and refilling it; by this means the quality of the oyster is much improved. They are not considered wholesome during May, June, July, and August, and are not eaten until they are one year and a half old.

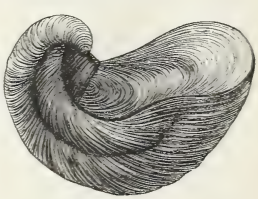
The animal of the oyster appears to be one of the most inanimate of the Mollusca; it remains fixed upon a rock, or other submarine object, enjoying only the nourishment

brought it by the waves, and giving scarcely a sign of life, except the opening and shutting of its valves.

It is supposed that above one hundred thousand bushels of oysters (*O. edulis*) are sold in London every season.

Dr. Mantell remarks that there are between thirty and forty species of fossil oysters found in Britain alone. He mentions that in the tertiary strata of the London basin there are oyster beds of vast extent, and in some places they are quarried and used for building purposes; whenever the strata round London are perforated to a sufficient depth, this oyster bed is reached. Sowerby speaks of immense masses of *O. gregarea* being found near Devizes attached to each other.

Gryphæa. *Lam.* — *Shell* inequivalve, free; lower valve large, concave, with the umbo prominent, incurved; upper valve small, flat, opercular-like; hinge toothless, with a curved depressed area; one muscular impression.* — Fossil.



Gryphæa incurva.

They are very remarkable for the curved produced beak of the lower valve. Mantell mentions that there are about thirty British species, one of which, *G. incurva*, is found in great abundance in the lias about Cheltenham. Another small species, *G. virgula*, is so abundant in the Kimmeridge clay, that it constitutes entire layers. The low cliffs on the west of Boulogne harbour, like those of Weymouth, are composed of this clay, and myriads of the *Gryphæa* are scattered on the shore.†

Exogyra. *Sow.* (Amphidonta *Fischer.*) — *Shell* resembling *Chama* in shape, but *Ostrea* in structure:

* Sowerby's Conch. Manual.

† Medals of Creation.

Exogyra.

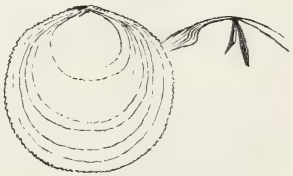
inequivalve, inequilateral, attached; umbones spirally curved to one side; hinge pit curved, nearly linear; an obtuse tooth in the flat free valve, fits into a cavity parallel with the hinge pit in the convex attached valve; one muscular impression in each valve.*—Fossil.

Carolia. *Cantraine.*—*Shell* not attached, slightly irregular, almost equilateral, inequivalve; the one valve flat, the other somewhat convex, with a distinct boss; the hinge in the flat valve with a large irregular tooth, in the convex valve there are two diverging supports; the ligament is short and strong, placed inwardly and under the bosses; only one deep central muscular impression. *Animal* not known.

Pododesmus. *Philippi.*—*Shell* attached, inequivalve, irregular, with unequal bosses, that of the under attached valve is spirally formed; the hinge is toothless; the ligament is entirely internal, and situated on a projecting plate; one single oval muscular impression. *Animal* unknown.—1 species.

P. decipiens from Cuba is the only living species.

Placuna. *Solander.* (Placenta, *Retz.*)—*Shell* nearly equivalve, irregular, very much compressed, iridescent; two internal cardinal teeth in one valve, shaped like a V, and in the other valve impressions to receive them; shell thin, and



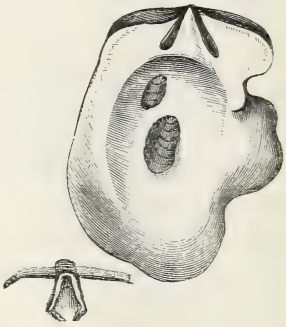
Placuna placentia.

* Sowerby's Conch. Manual.

nearly transparent. *Animal* very little known. — 3 or 4 species.

Found on sand in the Indian, Chinese, and Red Seas. The *Placuna Placentia*, commonly known as the Chinese window oyster, is sufficiently transparent to be used for windows and lanterns, as horn is used in this country.* Though the animal has not been much examined by naturalists, it is obvious that it must be exceedingly flat; indeed, not much thicker than a shilling; for the valves, when closed, appear nearly to touch. The shells are sometimes waved, and bent in a curious manner.

PLACUNANOMIA. *Brod.* — *Shell* irregular, nearly equivalve, smooth, plaited round the edge, and somewhat glossy inside; the hinge consists of two narrow ribs, unequal in length, and converging at the base, in one valve, and in the other two corresponding grooves; the lower valve has a longitudinal hole near the hinge, and the opening is entirely filled up by the ossification of the tendon passing through it; besides the muscular impression in the upper valve, there is a mark which shows the attachment of the other extremity of the tendon of adhesion. *Animal* unknown. — 10 species, (Gray).



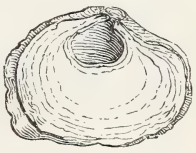
Placunanomia.

Mr. Cuming found one species of this singular shell

* Mr. Gray mentions that the Chinese use the powder of this shell as silver in their water-colour drawings. He has himself used it in colouring the figures of fish with good effect. It is not quite so brilliant as the powdered leaf metal, but it has the advantage of not changing colour by exposure.

attached to dead bivalve shells and coral, at the depth of eleven fathoms in the Gulf of Dulce, in Costa Rica, Central America. It is intermediate, as its name denotes, between *Placuna* and *Anomia:* the hinge is like the former, and the opening in the lower valve for the passage of the tendon causes its resemblance to the latter.

ANOMIA. *Lin.* — *Shell* inequivalve, more or less irregular, attached to rocks &c. by a calcareous mass affixed to the adductor muscle, which passes through a hole in the lower valve, the latter being small, and nearly flat; bosses very small, no teeth, ligament short and thick. *Animal* shaped like the shell, mantle freely open, with pendent margins, bearing a double fringe of short cirrhi; no conspicuous ocelli; no siphonal tubes; body massive; foot very small, often nearly obsolete; adductor muscle divided into three portions, the longest passing through the notch in the lower valve, and attached to the opercular piece, partly attached to the inner surfaces of the shell; branchial leaflets doubled on themselves; mouth surrounded by membranous borders, and two pair of long labial tentacles striated on both sides.* — 17 species†; also fossil.



Anomia ephippium.

From the Mediterranean and other European seas; also the seas of America, the Moluccas, Philippines, &c. It is found adhering to shells, rocks, and other substances, and takes the irregular form of the surface to which it is attached; so that if fixed to a *Pecten*, it will be striated. It cannot be detached without destroying the animal, and the calcareous mass by which the shell is attached is so

* Forbes's British Moll. † Gray's Sinopsis of Brit. Museum.

constructed as to close the hole in the valve when the muscle is contracted. The animal is phosphorescent, and is eaten in France. *A. ephippium* is a European species, and though eaten in France is considered unwholesome here. Besides this species there are three others British.

ÆNIGMA. *Koch.*—*Shell* distinguished from *Anomia* by the boss of the upper valve being distant from the edge, and also that from the boss to the edge there is a cleft; the under valve has on the outside of the cleft a fold from the hole, towards the hinge.—5 species.

Five species known in the Chinese seas; the type is the *Tellina ænigmatica* of Chemnitz.

CLASS V.—BRACHIOPODA.

THE animals forming this class are inclosed in a bivalve shell; the two valves are symmetrical, but not exactly alike, often connected by a hinge, and having no ligament. One valve answers to the ventral side, and the other to the back of the animal; at times the under one is firmly attached (like the oyster); usually, however, the upper one (seldom the lower) is perforated for the passage of a tendon by which the inhabitant anchors itself. The animal possesses two mantle lobes, which are always completely separated; these fulfil the functions of lungs, and, moreover, contain the branching ovaries. In the region of the mouth there are two spiral arms, which can be unrolled, and are usually beset with cilia. These extraordinary creatures occupy a lower scale in organisation than the Conchifera, or leaf-gilled animals; instead of the con-

tractile cirrhi which the latter have on the border of the mantle, the Brachiopoda have at the edge very brittle, glassy, stiff filaments, which are hollow, and take deep root in the substance of the mantle; they are very long in the *Discina* and *Lingula*, very small in *Terebratula*. A very complicated system of muscles serves to close the valves; in most cases four pair of closing or adductor muscles are distinguished, of which one pair only is inserted at both ends into the valves; the others are fixed by one end to the shell, and by the other unite themselves to the tendon, and serve to attach the animal to any foreign body. The impression of these muscles is therefore usually very distinct in both valves. The movement of the arm-like tentacles is produced by a peculiar apparatus; the fringes of these tentacles are set upon a cartilaginous, tubular, hollowed projection, diminishing towards its point. In the hollow of this projection, which is closed at both ends, a fluid is contained which, by the contraction of the circular muscles at their bases, is driven up to the point, by which means it stands erect, and seems to force the valves of the shell asunder. These tentacular arms in many Brachiopoda are situated upon a very remarkable, inner, calcareous or bony formation, which always originates in the imperforated valve, and is much diversified. In some two thin stalks run inwards from the hinge-teeth, which support a more or less complicated ring; sometimes there is a central perpendicular plate, which forms a sort of imperfect wall of separation; at others this sends off wonderfully developed arms, which frequently unite themselves with the arms issuing from the hinge teeth, and form a very complicated frame. No organ analogous to the foot of other Molluscs exists. The stalk by which many of the Brachiopoda are held fast, answers to that part in *Anomia*, and consists of a

soft tube, which perhaps is to be regarded as a prolongation of the mantle, and contains within it fibres either muscular or tendinous.

The nervous system is not yet sufficiently known, but two or three ganglia have been discovered surrounding the œsophagus. Moreover no organs of sense are known to belong to them, besides the cirrhi which act as feelers, on the edges of the mantle, and upon the arms. The digestive apparatus of the Brachiopoda does not differ essentially from that of other Molluscs. The intestinal canal begins with a simple opening concealed between the bases of the two tentacula, whence in the *Terebratula* proceeds a tolerably long, curved (or contorted) œsophagus, which leads into a roomy stomach, whilst in the rest of the Brachiopoda the intestinal canal is continued without any distension, making one or more convolutions. Salivary glands do not exist, but the liver is readily distinguished in the form of little fascicles of glands; it pours its secretion immediately into the stomach.

The system of blood vessels is very curious: the veins that return from the mantle gills do not unite into a single heart, but pour their contents into two separate hearts, lying to the right and left of the intestinal sac; by the contraction of these hearts, the blood is discharged freely without the intervention of vessels, into the intestinal cavity. The inner lining of the mantle serves the office of gills; it is furnished with a very complete system of blood vessels. In the genus *Lingula* the gill vessels are contained in a kind of tumid prominences, which give to the inner surfaces of the mantle a very peculiar appearance.

The structure of the shell has many peculiarities. In the *Discina* it is almost entirely horny. In the *Lingula* there is a marked epidermis, which is entirely absent in

Terebratula. The shells of the last named genus are finely perforated, the apertures being filled up in those living, by membranous or cellulose closed sacs.

Dr. Carpenter thus speaks of the curious formation of the shelly matter in this class: — "One of the most interesting points in the structure of *Terebratula*, or at least in certain species of it, is the existence of a large number of tubular perforations, passing directly from one surface of the shell to the other, and terminating by an orifice at each. The size of these perforations is sufficiently great to enable them to be detected with a hand magnifier, as minute punctations on the surface; and in this manner I have observed them in all the recent species of *Terebratula* (about fourteen) which have come under my notice, except in *T. psittacea*, which departs so widely from the general type in the incompleteness of the passage for the ligament that (as Mr. Stutchbury has suggested to me) it is probably to be considered as the recent type of *Spirifer*. Of the very numerous fossil species of *Terebratula* I have yet examined but a small proportion; yet the curious result has uniformly presented itself, that the perforations have invariably been found in the non-plicated, or moderately plicated species, whilst they have been absent in those which differ from the recent species, in being much more deeply plicated."

The Brachiopoda are pre-eminently creatures which have belonged to past times, hence the great number of fossil specimens, and the multiplicity of their forms, whilst comparatively, the number of living Brachiopoda is small, and they offer few distinctive characters. Mantell says there are five hundred fossil species known in the British strata alone. The living species are found in all seas, even on the icy coast of Spitsbergen, and usually prefer the deep seas.

The Brachiopoda are divided by Gray into three orders: — Ancylopoda, the animal having mouth arms, which are *not spirally* rolled; Helictopoda, having arms *spirally* rolled, and supported by a spiral appendage within the valves; and Rudistæ, the animal of which is not known.

Order I.

ANCYLOPODA.

The mouth arms are curved backwards (not spirally rolled), and attached to a solid shelly appendage in the ventral valve; they are only dilatable at the point, or not at all; the mantle adheres firmly to each valve in consequence of fine processes, which project into the pores of the shell. The shell is delicate, and drilled, or punctured throughout its whole substance; the stage on which the arms of the animal hang, springs either from the hinge of the ventral valve, or is fastened to a lamellated middle rib of the same; the dorsal valve is beaked, and has a hole at the boss, whence a sinewy stalk proceeds, by means of which the animal attaches itself to foreign substances. In some individuals this hole is obliterated in age; the hinge is furnished in each valve with two teeth, of which those in the dorsal are separated, and clasp between them the two in the ventral valve; these lock so firmly into each other that they cannot be separated without injury.

Family 1.— *TEREBRATULIDÆ.*

The description of this family is clearly given in that of the order.

These singular Molluscs inhabit great depths. Professor Owen observes that "both the respiration and nutrition of animals which exist beneath the pressure of from sixty to ninety fathoms of sea water, are subjects suggestive of interesting reflections, and lead us to contemplate with less surprise the great strength and complexity of some of the minutest parts of the frame of these diminutive creatures."

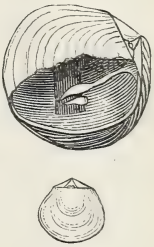
They fix themselves to other objects, and also to each other, by a tendinous cord, which proceeds from the hole in the boss. They have a curious kind of internal skeleton, as it may be termed, consisting of a slender, flattened, calcareous hoop, with other pieces diverging from it; this apparatus is for the attachment of the arms of the animal. The shells have no brilliancy of colour, but are generally of a dull brown. Some of them are striated or grooved outside, and toothed at the edge, locking firmly into corresponding teeth in the other valve. They are found in the European seas, those of New Zealand, and the Southern Ocean. The fossil species are very numerous; they have been termed the "fossil aristocracy," from the incalculable antiquity of their lineage. They are admirably illustrated in Sowerby's "Mineral Conchology."

TEREBRATELLA. *D'Orb.* — *Shell* of a punctured texture, generally broader than long, inequivalve; the upper valve has a straight obliquely truncated boss, from which springs a distinct area; the under valve is generally flatter than the upper, and has the hinge line nearly straight;

the hole in the dorsal or upper valve is more under than in the summit of the boss, and is oval or triangular; the deltidium is formed of two, generally separate pieces; the hinge has two distinct teeth in the upper valve fitting into two sockets in that opposite. The inner scaffold consists of a central plate which springs from the under valve, and two loop-shaped branches which project from the hinge, and are supported by this middle plate; the shell has dichotomous ribs, and for the most part in the upper valve a sinus or indentation, to which a saddle-shaped protuberance in the under valve answers.—2 species; also fossil.

The living species are *T. truncata*, and *chilensis* from the Mediterranean.

Magas. *Sow.* — *Shell* equilateral, inequivalve, one valve convex, with a triangular area, divided by an angular sinus in the centre; the other valve flat, with a straight hinge line, and two small projections; a partial longitudinal septum with appendages attached to the hinge within; differing from *Terebratula* in having a triangular disk, and not a circular perforation.*—Fossil.



Magas pumilus.

One species found near Norwich. Mr. Sowerby observes that this singular fossil shell (*M. pumilus*) "when magnified is found to be curiously punctured in a minute quincunx order, which appears to depend on the construction of it, as in most of the tribe related to the *Terebratula;* it is generally most apparent within the substance."

Bouchardia. *Davidson.* — *Shell* inequivalve, oval,

* Sowerby's Mineral Conch.

convex on both sides; dorsal valve with a short truncated beak, with a foramen at the extremity, which is entirely enclosed by the continuous edge of the shell, but without any deltidium, or true area; hinge with two strong teeth in the dorsal, fitting into sockets in the ventral valve; on the dorsal valve there are also two deep grooves reaching from the beak to near the middle of the shell, which receive two strong diverging teeth placed on the opposite valve; this system of articulation gives great thickness to the interior part of the shell; ventral valve with a medial ridge from which rise a pair of arched calcareous plates.

The only species is *B.* [*Terebratula*] *rosea* of Sowerby, from Brazil.

Terebratula. *D'Orb.*—*Shell* free, of a punctured texture, oval or round, depressed or gibbose, inequivalve; the upper valve larger, convex, with no distinct area, but a projecting beak, obliquely truncated; lower valve smaller and less gibbose with its arched summit concealed under the deltidium of the upper valve; opening round and terminal, at the extremity of the beak of the upper valve, and separated from the lower valve by a deltidium formed of the pieces soldered together. Internal apparatus on the lower valve formed of lateral callosities at the hinge supporting two cartilaginous, or testaceous arms which fold back and meet.—1 species; also fossil.

Terebratula.

This genus by D'Orbigny admits only those species which have a round hole in the point of the boss of the dorsal valve, which therefore appears blunt; the area is wanting; but a distinct deltidium exists. *T. cranium* is the living species, found on the coasts of Norway. Fossil species are in great numbers, from the oldest to the newest formations.

GRYPHUS. *Megerle* v. *Muehlfeld.* — *Shell* separated from the foregoing solely because the inner scaffold forms a complete ring, which is borne upon two stalks, and in the lower valve there is no spur with a middle rib.

The type of this genus is *T. vitrea* from the Mediterranean; the genus is scarcely distinguishable from the last.

TEREBRATULINA. *D'Orb.*—*Shell* free, of a punctured texture, oval, oblong, depressed; the larger or dorsal valve is more strongly arched than the ventral; the boss is projecting, straight for the most part, obliquely notched at the end; without distinct area; the under valve has a distinct boss, and on each side an ear as in *Pecten;* the hole in the boss is oblong, and takes in the whole extremity, from whence it continues to the boss of the under valve without forming a deltidium; the hinge is as usual; the inner scaffold is supported by a lateral apophysis on each side, which springs from the hinge, converging inwards, from which rise two arms meeting twice so as to form a short tube; the upper surface is covered with forked ribs. — ? species; also fossil.

This genus is separated from *Terebratula* by having no deltidium, a simple inner scaffold and forked ribs; from *Terebratella* by the absence of area and deltidium, the longitudinal beak hole, and the want of the middle plate in the interior. The type is *T. caput serpentis* from the European seas.

TEREBRIROSTRA. *D'Orb.*—*Shell* free, of a punctured texture, elongated, inequivalve, the upper valve being very much longer than the other; the beak is very long, and under it there is a long flat smooth area, extending from the hinge to the point; the under valve is oval, short, sometimes only a third part the length of the upper;

the hole at the extremity of the beak is round; the deltidium is single and very much lengthened; the hinge teeth are as usual; a long apophysis springs from the hinge of the smaller valve, and extends under the deltidium to the other; the inner scaffold is placed in the smaller valve on a very conspicuous middle plate, and there is the rudiment of a loop-shaped apparatus at the base of the hinge.— Fossil.

Only known in the chalk formation; the type is *T. Lyra.* Sowerby illustrates this species in Mineral Conchology, representing the beak lengthened out so much that it is as long as the whole of the smaller valve, giving the shell a singular appearance.

Fissurirostra. *D'Orb.* — *Shell* free, of a punctured texture, oval or triangular; the larger valve very convex, with a flat broad triangular area, which extends from the hinge to the extremity of the long projecting curved beak; the small valve is flat, or even concave; the hole in the beak has the form of a long slit, commencing at the point of the beak; the deltidium is triangular, and single; the hinge teeth are as usual; the smallest valve has springing from the beak, a very long horizontal apophysis which extends under the deltidium to the large valve; the inner scaffold is in the small valve placed on a projecting middle plate; traces may also be seen of a loop-shaped process at the hinge; in the middle of the valve an oval impression appears on each side near the middle plate. The outer surface is furnished with numerous dichotomous folds. D'Orbigny conjectures that the opening at the beak is closed in age.—Fossil.

The species are only found at present in the chalk formation. This genus and the preceding are by most naturalists considered not distinct.

Family 2. — *THECIDEADÆ.*

The arms of the animal are entirely united in the form of two or more lobed processes, which are sunk into grooves on the convex inner surface of the ventral valve.

MEGATHYRIS. *D'Orb.* (Argyope *Deslongchamps.*) — *Shell* inequivalve, inequilateral, semi-orbicular, compressed, often strong, surface smooth or with radiating ribs, always punctured, area large, triangular, with a large incomplete foramen under the beak of the upper valve, and impinging on the lower; no deltidium; no free apophysary system, but one or more ribs or dissepiments, arising from the inner surface of the smaller valve. *Animal* with contorted or spiral arms fixed to the margin of the apophysary ribs or cardinal teeth.* — Few species; also fossil.

Megathyris cistellata.

Mr. Forbes remarks that "the few living species known of this interesting genus are inhabitants of deep — of very deep — water." *M. cistellata* was formerly only known in the fossil state, but a few specimens have been lately procured, attached to stones at great depths, off the coast of Scotland. Philippi remarks that *M.* (Anomia) *detruncata*, of Gmelin, is the type of the genus, and is found in the Mediterranean.

THECIDIUM. *Defrance.* — *Shell* ovate, small, inequivalve, nearly equilateral, imperforate, and attached by the concave valve, which has two short cardinal processes, and a rather irregular area, extending from the hinge to the boss; the smaller valve is rather flat, and has a small

Thecidium mediterranea.

* Forbes's British Moll.

obtuse appendage near the base, and two processes closely locking into those of the lower valve. *Animal* unknown. — 1 species.

Found in the Mediterranean, and the species is called *Mediterranea* in consequence. The interior of the upper valve is curiously indented so as to fit certain parts of the body of the animal; these marks spread from the hinge, and look exactly as if they were picked out in wax. The inside of both valves is a pale green colour, and finely granulated.

Order II.

HELICTOPODA.

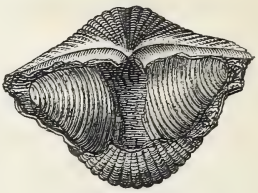
The mouth arms of the animal are, when in repose, regular, and spirally rolled together; the mantle lobes are placed close to the interior surface of the valves (but the valves are not pierced with minute perforations like those of Terebratulidæ); the shell has sometimes small pointed appendages on the exterior, which during the increase of the shell were formed at the edge.

Family 1. — *SPIRIFERIDÆ.*

The mouth arms are very strongly developed, and are supported in their whole length by a thin calcareous, or cartilaginous? spirally twisted plate. Only known in the fossil state.

Spirifer. *Sow.* (Delthyris *Dalman;* Choristites *Fischer;* Trigonotreta *Konig;* Brachythyris *M^c Coy.*) —

Shell transverse, equilateral, hinge linear, straight, widely extended on both sides of the umbones, which are separated by a flat area in the upper or larger valve; this area is divided in the centre by a triangular pit for the passage of the byssus; interior with two spirally convolute appendages.*—Fossil.



Spirifer trigonalis.

Distinguished from *Terebratula* by the flat area in one valve, and the singular spiral processes, from which the name is derived. Dr. Mantell observes that the calcareous convoluted appendages in the interior of this shell, are often beautifully preserved in the fossil state; they seem to have been as supports, to the ciliated arms of the animal when living.

Cyrtia. *Dalman.* (Acrotreta *Kutorga.*)—*Shell* with hinge rectilinear; the back elevated into a semi cone, or half pyramid, the cardinal side perpendicularly plane.†—Fossil.

Atrypa. *Dalman.* Actinoconchus, *M'Coy.*)—*Shell* nearly equivalve, equilateral, both valves convex; hinge furnished with two spiral appendages; its margin short, arched; the area between the beaks small, generally convex, rarely flat, with a triangular pit or notch in the middle, closed by a deltidium admitting the smaller beak; beaks pointed, incurved.‡—Fossil.

Athyris. *M'Coy.* (Spirigera *D'Orb.*—*Shell* nearly orbicular, small; no cardinal area, or hinge line; spiral appendages very large, filling the greater part of the shell.—Fossil.

This genus is established for such *Terebratula* as combine

* Sowerby's Mineral Conch. † Ib. ‡ Ib.

with the inner spiral appendages of the *Spirifer*, the outer appearance of the smooth species, as *T. tumida*, *circe*, and *concentrica*.

Martinia. *M'Coy.* (Reticularia *M'Coy.*)—*Shell* with the hinge line shorter than the width of the shell; dorsal edges of the cardinal area obtusely rounded; surface smooth; spiral appendages small.

These shells are separated from *Atrypa* by there being an area with a free deltidium. The genus includes *Terebratula rostrata*, *glabra*, *hyalina*, *lineata*, and *lævigata*.

Stringocephalus. *Defrance.* — *Shell* free, fibrous, oval or round, transverse, gibbose, inequivalve; upper valve very large, convex, with a triangular area extending from the hinge to the point of the incurved produced beak: lower valve much shorter, convex, with no area, and its apex usually concealed; opening round, placed in the middle of the length of a broad triangular deltidium formed of two pieces joined together, and which separates the opening from the lower valve; internal apparatus, one strong medial plate on the upper valve, with sometimes two other smaller plates; the lower valve has on the medial line a strong apophysis terminating in a fork, and also two ribs rising from the sides of the hinge, and converging towards the middle of the valve, where they terminate in a long branch bent towards the upper valve.

The type of the genus is *S. Burtoni*, besides which, a few others have been found in the Devonian strata.

Family 2. — *RHYNCHONELLIDÆ.*

The mouth arms are prolonged, fleshy, supported at the base by two short, diverging laminæ, which spring from the hinge of the ventral valve. The shell is not perforated, usually radiated; the hole for the passage of the tendon is not in the point of the boss itself, but below it, therefore the boss remains pointed.

RHYNCHONELLA. *Fischer.* (Cyclothyris and Semiluna *M'Coy;* Lampas *Gray;* Hypothyris *Phillips.*) — *Shell* free, fibrous (not of perforated structure), oval or transverse, depressed or gibbose, inequivalve, upper valve larger, without a distinct area, with a produced, incurved beak; lower valve gibbose, with its apex concealed in the upper valve; opening small, round, below the point of the beak of the larger valve, surrounded by a tubular projection, and separated from the lower valve by a deltidium formed of two pieces soldered together; the inner scaffold is attached to the under valve on each side of a long apophysis, which is flat, and almost channel-formed, springing from the hinge and ending in a broad part which bears the free fleshy arms. — 1 species; also fossil.

The only living species is the *Terebratula psittacea* of the Northern Icy Seas. The fossil species found in the chalk formations are *T. peregrina* of Buch, *depressa,* Sow., *lata,* Sow., and *vespertilio,* Broc.

HEMITHYRIS. *D'Orb.* — *Shell* free, fibrous, oval or transverse, gibbose, inequivalve; the upper valve larger, convex, without distinct area, with a produced incurved beak; lower valve gibbose with its apex concealed; opening in the upper valve, small, oblong, in the form of a slit, reaching from the edge of the lower valve to the beak, without any deltidium. — Fossil.

These shells are separated from *Rhynchonella*, because the round hole is situated in the hinge margin, whilst in that genus the hole is separated from that part. D'Orbigny is inclined to divide this genus into two; he limits the above name to those shells which have neither pores nor spines, and gives the name of *Acanthothyris* to those which have perforated spines on the shell.

The species are found in most formations, as well as the oldest. This genus is considered by many synonymous with *Rhynchonella*.

Camerophoria. *King.*—*Shell* hypothyriform; coarsely fibrous, and minutely punctured, with a small open fissure; larger valve with the dental plate conjoined at the upper margin forming an arch-shaped process, which is attached by its crest to the (ventral) medio-longitudinal plate: small valve with two long slender processes striking off from the centre of the crural base—a horizontal plate—and curving up towards the opposite valve; also a spatula-shaped process, originating a little below the latter, projecting considerably forward with an upward curve, and supported by the (dorsal) medio-longitudinal plate.

The peculiar spoon-shaped supports distinguish this genus; formed from *Terebratula Schlotheimi*, &c.

Uncites. *Defrance.*—*Shell* free (?), inequivalve, regular; largest valve with a protruding beak, curved, not pierced at the summit; that of the smaller valve is curved, and concealed under that of the larger valve: hinge (doubtful), from which hang two thin bony pieces, in the form of scythes, which enter into the smaller valve; a considerable hollow is found both on the anterior and posterior side —Fossil.

A doubtful genus; the species is *U. gryphus*.

PENTAMERUS. *Sow.* (Gypidia *Dalman.*) — *Shell* inequivalve, equilateral; one valve divided by a central septum into two parts; the other by the septa into three parts; umbones incurved, imperforate.*—Fossil.

Pentamerus Aylesfordii.

Dr. Mantell mentions that these fossils differ in their internal structure from all other genera, in being divided internally into five chambers, whence the name, which means five celled: several species are known; *P. Knighti* Sow., (*Terebratula*) *conchidium, lævis, &c.*

Family 3.—*PRODUCTIDÆ.*

The mouth arms are fleshy, without any shelly support; the ventral valve has no sort of process, either from the hinge edge or yet from the inner surface, or at the utmost a slight longitudinal support in the middle; the shell is not pierced at the boss, and is either free or fastened by means of the upper surface of the ventral valve; the upper valve is abundantly covered with spines.

PRODUCTUS. *Sow.*— *Shell* equivalve, equilateral, thick, striated: one valve generally convex, with the margins reflected, and produced; the other valve flat, or slightly convex with the margin reflected; hinge rectilinear, transverse.†—Fossil.

STROPHALOSIA. *King.*— *Shell* with the large valve (oc-

* Sow. Conch. Manual. † Sow. Mineral Conch.

casionally the small one) furnished with an area divided by a deltidium; both valves articulating by means of teeth and sockets; the former situated on each side of the base of the deltidium of the large valve, and the latter on each side of the boss or cardinal muscular fulcrum of the small valve.—Fossil.

This genus differs from *Productus* in having an area and deltidium to one valve; it is, however, not generally adopted.

CHONETES. *Fischer.* — *Shell* free, testaceous, of perforated texture, oval, transverse, depressed, inequivalve; large valve convex, with a smooth, straight, narrow area, interrupted by a projection of the other valve; and with tubular spines placed on the exterior edge of the area at regular distances; small valve concave, with a small area; hinge line straight.—Fossil.

AULOSTEGES. *Helmersen.* — *Shell* with both valves convex as in *Orthis*, the hinge usually the whole breadth of the shell; dorsal area high, with a small opening covered by an arched deltidium; ventral area rudimentary, with a small deltidium which surrounds the base of an elevated double tooth; both valves set close with hollow spines.—Fossil.

LEPTÆNA. *Dalman.* (Plectambonites and Orthambonites *Pander.*)— *Shell* having the hinge area in each valve extending the whole width of the shell, and the margins of the valves produced together beyond that part of the shell which contains the animal, and bent down so as to form a kind of inverted cup; the flatter (lower) valve has no projecting beak, but in the middle of its hinge-line, is a process which nearly fits the aperture in the convex deltidium of the other valve, which slides upon

it as it opens or closes; this process is divided within into two diverging teeth; the same valve has a smaller longitudinal septum in its middle, between the muscular impressions. The beak of the (upper) convex valve is in some species produced considerably. — Fossil.

" All the species have striated surfaces, and many have long spines, often tubular on the outside, and numerous little spine-like projections within."*

DAVIDSONIA. *Bouchard.* — *Shell* inequivalve, adhering by its lower valve, which is very thick; area not separated from the rest of the valve; deltidium filled up by the solid matter of the shell; hinge with two strong teeth like those of *Terebratula*, with two deep anterior muscular impressions placed between the dental plate; two posterior muscular impressions in the form of elevated massive cones.—Fossil.

This description applies only to the lower valve, M. Bouchard not having seen the upper.

ORTHIS. *Dalman.* (Orthotetes *Fischer;* Gonambonites, Orthambonites, Bonites, Hemiperonites, Klitambonites *Pander.*) — *Shell* with hinge rectilinear, with umbones distant; the larger valve with a transverse basal smooth area, with a triangular pit.†—Fossil.

Orthis basalis.

ORTHISINA. *D'Orb.* — *Shell* free, not perforated, oval or angular, transverse, depressed, inequivalve; the pierced valve very large, sub-conical, with a very large area; the unpierced valve nearly flat, with a smaller area than the other; opening round, placed below the beak of the upper

* Sow. Mineral Conch. † Sow. Conch. Manual.

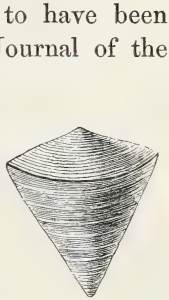
valve, in the middle of a triangular deltidium, which reaches to the lower valve; this opening is sometimes closed in old shells.

This is a doubtful genus.

STROPHOMENA. *Rafinesque.* (Leptagonia *M'Coy.*)—*Shell* nearly flat, or slightly and regularly curved, semicircular, or semi-oval, with a long, straight hinge; a triangular area on the flatter valve, with a triangular arched deltidium, at the apex of which there is sometimes a small round opening; a narrow straight area on the convex valve; valves usually regularly radiated; the interior of each valve has three straight plates, or elevated lines, diverging from the hinge, and bounding the muscular impression, the fore part of the muscular impression not being bounded by any ridge or elevation.—Fossil.

Rafinesque's original description seems to have been lost: the above is by Mr. Sharpe, in the Journal of the Geological Society.

CALCEOLA. *Lam.* — *Shell* equilateral, inequivalve, triangular; umbones separated by a large triangular disk in the lower valve; cardinal margin straight, linear, dentated; lower valve large, deep; upper valve flat, semiorbicular, forming a kind of operculum to the lower.*



Calceola sandalina.

A very singular shell, known only in the fossil state.

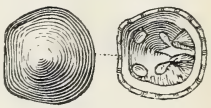
Family 4. — *CRANIADÆ.*

The mouth arms are fleshy, without any shelly support. The shell is calcareous; the under valve is attached by its

* Sow. Conch Manual.

whole surface; the upper is flatly conical, like a *Patella;* no hinge.

Crania. *Retz.* (Orbicula *Cuvier.*)—*Shell* compressed, somewhat square, inequivalve, equilateral, the upper valve convex and *Patella*-shaped, the lower flat and attached, and not possessing a hole; the interior exhibits four very distinct muscular impressions; no cardinal processes, and no hinge. *Animal,* with two large, horizontal, cirrhated, buccal appendages, each forming a short spiral arm curved inwards, free and unprovided with any skeleton.*—4 species; also fossil.



Crania.

Found in the Indian Seas, and on the coasts of Scotland and Ireland. Forbes says, "the arms are extended horizontally, each forming a rather short, graceful, plume-like curve, the fringe side being outermost. The fringes are long and rather stiff, and can be extended slightly beyond the shell; they are of a fleshy white colour. When the upper valve is removed, the fringed arms are seen lodged in it."

Dr. Mantell mentions that the fossil specimens of this genus are often found adhering to the Echinites of the chalk, and that in many of the quarries in Kent and Sussex the helmet Echinites bear groups of these shells.

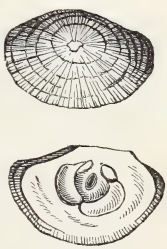
Family 5.—*DISCINIDÆ.*

The mouth arms are fleshy; at the base there is no calcareous or other support: the under valve is without processes, but has a slit for the exit of a short sinewy tendon; the upper valve is cone-shaped, or bowl-shaped;

* Forbes' British Moll.

no hinge; the substance of the shell is more horny than calcareous, and is even flexible when moist.

Discina. *Lam.* (Orbicula *Owen;* not *Cuvier.*)—*Shell* horny, orbicular, rather irregular, inequivalve, rather compressed, the upper valve like a *Patella,* the lower flat, and attached; in the centre of the latter is a small oval depression, with an oblique fissure in it for the passage of a tendon; four muscular impressions in each valve; no hinge or ligament. *Animal* having two short ciliated arms, and a muscle or ligament which passes through a fissure in the shell and adheres to other substances.—Few species; also fossil.



Discina.

These shells are found in the Northern Seas, also in those of Peru and Chili; the individuals are often found grouped on each other.

Siphonotreta. *De Verneuil.* — *Shell* inequivalve, equilateral, texture rather horny; valves with free teeth, not articulated; large valve convex, the boss submarginal, and pierced with a rather round hole, which is oblique; the small part of the valve, comprised between the boss and the cardinal edge, has neither perforation nor deltidium, and is covered with lines of growth which surround circularly the boss, as in the genus *Orbicella:* the opening at the apex has an open tube which is prolonged into the centre of the shell; the smaller valve is oval, and is a little less convex than the opposite valve.—Fossil.

Trematis. *Sharpe.* (Orbicella *D'Orb.* Schizotreta *Kutorga.*)—*Shell* suborbicular, inequivalve, attached by a ligament passing through a longitudinal fissure in the posterior part of the ventral valve; valves united by a hinge which is supposed to resemble that of *Terebra-*

tula, and is accompanied, in the dorsal valve, by three diverging internal plates; shell regularly punctured externally; pearly, fibrous, and slightly striated internally.—Fossil.

This description by Mr. Sharpe was *published* under the name of *Trematis* two years before D'Orbigny's *Orbicella*, and therefore ought to have the precedence, though Philippi places the latter first. Mr. Sharpe's account is in the Journal of the Geological Society, vol. iv. p. 68.

Family 6.—*LINGULIDÆ.*

The mouth arms are fleshy, without any shelly support. The valves of the shell have no hinge, are almost equal, lengthened, covered with a horny epidermis, sometimes the shelly layer is so thin that the shell is flexible, almost cartilaginous; they have a thick peduncle proceeding from between the two bosses, of a fleshy character.

LINGULA. *Brug.*—*Shell* thin, either horny, or calcareous, equivalve, equilateral, somewhat peaked at the apex, generally open at the base; valves destitute of a hinge being supported by their muscular adhesion, and attached by a thick fleshy peduncle proceeding from between the bosses. *Animal* with two long ciliated arms, curled up during repose.—7 species; also fossil.

Lingula anatina.

Mr. Cuming met with considerable numbers of these shells in the Philippines, where the inhabitants use the mollusc as food. They are generally found in hard sand at low water.

OBOLUS. *Eichwald.* (Ungulites *Pander;* Aulonotreta

Kutorga.) — *Shell* subconical, free, regular, depressed, suborbicular, equilateral; the bosses are scarcely terminal, prominent, inequivalve; the boss of the superior valve more projecting, and provided within, with a strong channel for the insertion of the peduncle; the other valve is shorter, and has no internal channel; no hinge, the valves being held together by the muscle.—Fossil.

Order III.

RUDISTÆ.

The animals of this order are unknown. The shells are bivalve, inequivalve, without a hinge, attached; of a peculiar cellular porous structure, on their inner surface; provided with peculiar moulds and impressions which are difficult to describe.

Family 1.—*RADIOLITIDÆ.*

The under valve is more or less cone-shaped, firmly attached, of a cellular or fibrous structure; the upper valve conical, or spirally wound, and free.

Radiolites. *Lam.* (Sphœrulites *La Méth.;* Acardo *Brug.*)—*Shell* composed of two valves, which do not unite at the edges of their bases, but of which the longer and larger envelopes the other, and the dorsal disk of each is elevated into the form of a nearly straight cone, slightly arched interiorly: these horn-shaped valves are unequal, and diverge obliquely in the form of the letter V, whose

branches form a very obtuse angle, and unite at their bases.—Fossil.

These objects are not regarded as shells by some naturalists; the above description is Mr. Sowerby's.

Caprina. *D'Orb.*—*Shell* fixed, testaceous, and very thick, the inferior valve of a lamellated texture; superior fibrous, inequivalve; inferior valve conical and oblique, fixed by its boss (crochet); marked in the interior by a longitudinal groove *; superior valve, very large, convex, with a lateral hook or boss, which is sometimes spirally turned; perforated throughout the greater part of its length (proceeding from the edge), by a series of longitudinal canals, some of them large within, others small on the outside, all separated by vertical partitions; hinge internal, and very complicated; no ligament. Internal apparatus formed in the inferior valve of a large conical cavity, and a considerable number of horn-shaped conical cavities formed by vertical partitions; superior valve divided in the interior into two large conical cavities, and moreover provided in the region of the cardinal teeth with a series of horn-shaped conical cavities corresponding to those of the other valve; all are circumscribed by vertical thin plates.—Fossil.

Mr. Sharpe is of opinion that this genus is allied to the Chamaceæ—and has no connexion with Rudistæ, or even Brachiopoda.

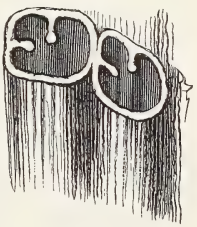
Family 2.—*HIPPURITIDÆ.*

The under valve of the shell is lengthened, almost cylindrical, gradually increasing in diameter, of a solid laminated

* The "longitudinal groove" is in all probability for the ligament, and therefore D'Orbigny is wrong in saying the latter does not exist.

texture; the upper valve is almost flat, and pierced with peculiar pores radiating to the circumference with branches diverging to the surface.

HIPPURITES. *Lam.* (Orthoceratites *Picot de Lapeyrouse.*) — *Shell* tubular, rude, irregular, attached; lower valve cylindrical, more or less lengthened, apparently divided into sections by septa (considered by some authors as merely projecting layers of growth), having one or two lateral tubes within; upper valve round, flat, fixed on the aperture of the tubular valve like an operculum.—Fossil.



Hippurites cornucopia.

Dr. Mantell, who thinks it very doubtful whether this shell is a bivalve or univalve, says they attain considerable size in certain districts of the Pyrenees, where they abound, and are called petrified horns by the inhabitants. The description above is Mr. Sowerby's.

Family 3. — *CAPROTINADÆ.*

The lower or fixed valve is conical, spirally twisted, and marked internally with prominent ridges, or transverse septa; the dorsal or free valve is oblique or spiral. They are distinguished by the non-cellular or fibrous texture of the shell.

CAPROTINA. *D'Orb.* (Monopleura *Mathéron.*) — This genus seems to have been formed by D'Orbigny of a variety of species belonging to other genera, such as *Diceras, Chama, Caprina,* &c., and is said to be a "hopeless mass of confusion."

CAPRINULA. *D'Orb.* — *Shell* free, testaceous, of a fi-

brous texture, inequivalve, inferior valve very long, conical, fixed by the extremity of the horn-shaped boss, marked exteriorly by a longitudinal groove; between the internal and external coat, there is a series of round or angular canals (the larger ones near the internal border, the others small, between the first and the external coat), which perforate throughout the thickness of the shell: superior valve twisted into an oblique spiral, provided in the interior of the shelly matter by canals analogous to those of the other valve *; it appears to be united to the other without hinge.—Fossil.

Mr. Sharpe has the same opinion of this genus as of Caprina.

Caprinella. *D'Orb.* (Ichthyosarcolithes, *Desmarest.*) This genus, formed by D'Orbigny out of some specimens he afterwards lost, is scarcely admissible.

The Sixth Class, Tunicata, of Lamarck, will not be described in this work, as the Molluscs have no shell.

* This is not considered correct by Mr. Sharpe.

EXPLANATION OF TERMS.

Acephalous. Mollusca without an apparent head; comprehending the Bivalves of conchologists.

Acuminated. Ending in a graduated, and often acute, point.

Adductor Muscle. That which closes the two pieces of a Bivalve together, the base or insertion of which is indicated by an irregular depression in each valve, these being called the muscular impressions. (See *Muscular Impressions.*)

Annulated. Marked with rings.

Anteally. In front, forward.

Anterior. The side of the shell, in Bivalves, where the ligament is situated. (See *Posterior.*)

Aperture. The mouth or opening of the shell in Univalves, from which the head of the animal protrudes.

Apex. The commencement or top of the spire in Univalves.

Apical. Belonging to the apex.

Apophysis. The projecting, soft end of a bone.

Area. A flat space.

Articulated. Jointed.

Auriculated. (*Eared.*) A term given to a few Bivalves which have a flat angulated projection on one or both sides of the umbones or bosses: these processes are most developed in the *Pectens.*

Auriform. (*Ear-shaped.*) Shaped like an ear; as the *Haliotis.*

Axile. Belonging to the axis, or middle.

Base. The extremity opposite to the *Apex*, in Univalves: in such Bivalves as adhere to other substances by one of their valves, as in *Spondylus*, *Chama*, &c., that valve is termed the *basal.*

Bicarinated. Having two elevated or sharp ridges. (See *Carinated.*)

Bicornute. Like, or having two horns.

Bifid. Cleft in two.

Bifurcated. Twice forked.

Boss. The projecting point in each valve, near the hinge in Bivalves; the commencement of the shell.

Branchiæ. Gills, breathing organs.

Byssus. A bunch of silk-like fibres, by which many species of Bivalves are attached to other substances.

Callosity. A thick mass of shelly matter.

Canal. A groove or gutter observable in different parts of certain spiral shells belonging to the *Zoophaga*, or carnivorous tribe. In these the canal is either lengthened, as in *Murex*, short, as in *Harpa*, or truncate, as in *Buccinum:* in the two latter it thus gives place to a notch, but in all these instances, it is that part fitted for the protrusion of the long cylindrical siphon possessed by all these animals.

Cancellated. When the surface is marked by striæ or lines, which cross each other at right angles.

Capital. Belonging to the head.

Cardinal Teeth, in Bivalves, are those placed immediately beneath the bosses, and between the lateral teeth, where such exist, as in the common *cockle.*

Carinated. Ridged like the keel of a boat.

Cartilaginous. Gristly, like a tendon.

Chambered. Divided internally into compartments, as in the *Nautilus.* (*Polythalamous.*)

Cilia. Vibrating hairs.

Cirrhus. A curl.

Columella (or *Pillar*). The internal support of most spiral shells, round which the whorls convolute; it is not present in *Solarium*, *Delphinula*, &c.

Concentric. Arranged in parallel curves or bands, having one common centre.

Connate. United together.

Conoidal. Resembling a cone.

Convoluted. The whorls rolled regularly one over the other.

Cordate. Heart-shaped.

Corneous. Resembling the colour or substance of horn; the epidermis of some, and the operculum of other spiral shells often present this appearance.

Coronated. Crowned towards the *apex*, by a row of spines.

Crenated. Notched.
Crenulated. Full of notches.
Cuneiform. Wedge-shaped, as *Donax.*
Cuticle. The skin.

Deciduous. Falling off.
Decollated. Having several whorls broken off.
Deltidium. A three-sided space.
Dentated. Toothed.
Denticle. A small tooth.
Dextral. Spiral shells are so called when the mouth faces the *right* hand of the observer, the shell being held with the *apex* upwards. The great majority of spiral shells are dextral, but frequently in the very same species (as in *Bulimus*) individuals occur whose aperture is reversed, or appears on the *left* side. (See *Sinistral.*)
Digitated. The expansion of any particular part, as in the outer lip of the *Pteroceras* into finger-shaped processes.
Discoid. Disk-shaped, much flattened. The fresh-water genus *Planorbis*, and many of the *Helicidæ*, or land-shells, are of this form.
Dorsal. Belonging to the back.

Effuse. Having the lips separated by a gutter or channel.
Elliptical. Oval.
Emarginate. Notched at the edge.
Embryonic. Immature, unfinished.
Ensiform. Shaped like a sword.
Entire. Having the aperture undivided at the base by a channel.
Epidermis. The membranous covering of some shells.
Epiphragma. A covering to the aperture of some spiral shells, which (unlike the *operculum*) is not attached to the animal. (See *Operculum.*)
Equilateral. When the two sides of a Bivalve are equal, the bosses being nearly or quite in the middle: as in the *cockle.*
Equivalve. When the two valves of a Bivalve are equal in size; as in the *cockle.*
Eroded. Gnawed, or rubbed.

Fibrous. Resembling fibres: applied to the substance of a shell, it indicates those, like the *Pinna*, whose fracture presents perpendicular fibres.

Filiform, Filamentary. Thread-like.
Fimbriated. Fringed.
Fluviatile. Living in fresh water.
Foliated. Composed of thin plates, lying on each other, as in the shell of the *oyster.*
Foramen. A slit.
Furcated. Forked.
Fusiform. Shaped like a spindle, swollen in the middle, and tapering to each end.

Gaping. In Bivalves, when, the shell being closed, the valves do not touch each other in every part.
Gelatinous. Like jelly.

Hamate. Scythe-shaped.
Hastate. Spear-shaped.
Hinge. The part where the valves of a Bivalve are united, consisting of ligament and teeth, the portion on which they are situated being called the hinge lamina, or line.
Hyaline. Of a glassy, thin, and semi-transparent substance.

Imbricated. Lying over each other like tiles.
Inequilateral. When the sides of a Bivalve are unequal in length. (See *Equilateral.*)
Inequivalve. When the valves of a Bivalve are unequal in size and shape, as the *oyster.* (See *Equivalve.*)
Inferior Valve. In adherent Bivalves, that by which the shell is attached to other substances.
Involuted. Rolled in.
Iridescent. Pearly, or having the appearance of pearl.
Irregular. In Bivalves, when the individuals of a species are not all of the same shape.

Laminar. Formed of thin plates.
Lanceolate. Shaped like the head of a lance.
Lateral. Any thing on the sides of a shell. Thus the lateral teeth of Bivalves, where they exist, are on one or both sides of the cardinal teeth, which are always in the centre, under the bosses.
Length of Shells. Spiral shells are measured from the *apex*, or tip of the spire to the *base*, and therefore perpendicularly; but the

length of Bivalves is taken horizontally, or from the anterior to the posterior margin.

Ligament. A cartilage connecting the two valves of a Bivalve.

Linear. Like a line.

Linguiform. Tongue-shaped.

Lips. The two sides of the aperture of spiral shells are termed the lips. That which joins, and generally folds over the lower part of the columella is called the *inner* lip, while that part of the circumference opposite is called the *outer* lip.

Litoral. Belonging to, or found on the shore.

Lobed. Having broad finger-like divisions.

Longitudinal. In Univalves, stripes or marks from the *apex* to the *base* are called *longitudinal*, in opposition to *transverse*, which is applied to such as cross the shell, or are parallel to the whorls: in Bivalves, stripes from the anterior to the posterior margin are *transverse;* from the bosses to the ventral margin *longitudinal*, or more properly *radiated.*

Lunate. Moon-shaped.

Mammiliform. Nipple-shaped.

Mandibles. Jaws.

Marine. Belonging to, or found in the sea.

Median. In the middle.

Mentum. A chin.

Monothalamous. Having only one chamber, in opposition to *Polythalamous:* the *Argonauta* is an instance.

Muscular Impressions. The indented marks in acephalous Bivalves, which indicate the insertion of the muscles, by which the animal is attached to its shell. Of these there are three principal sorts: lateral, central, and pallial. 1. The *lateral* impressions indicate the animal to have two adductor muscles, as in *Unio*, *Cardium.* 2. A *central* impression shows the presence of one adductor muscle, which is generally in the middle of the shell, as the *oyster.* All these shells are, however, furnished with a third, the *pallial* or mantle impression, which is indicated by a depressed line running parallel with the ventral margin. (See *Adductor Muscle.*)

Nidus. A nest.

Nucleus. The first formed part of a shell.

Obsolete. This term implies a faint indication of particular characters. Thus, very slight or partially indistinct striæ upon a shell are

called *obsolete* striæ, not because they are worn off by accident, but because they are only rudimentary, or very slightly developed.

Operculum. A hard shelly or horny lid, which covers the aperture of many spiral shells, and is attached to the foot of the animal. (See *Epiphragma.*)

Orbicular. Quite round.

Ovate. Egg-shaped.

Papyraceous. Excessively thin, like paper.

Peduncle. A stalk, or support.

Pelagic. Belonging to, or found in, deep seas.

Perforated. Having holes (as the Terebratula) in the boss, and also in the substance of the shell.

Peritrême. The entire edge of the aperture, embracing both lips.

Persistent. Lasting, not falling off.

Phosphorescent. Shining in the dark, like the glow-worm.

Plaits. Folds, or raised lines on the *Columella.*

Planorbicular. Flat, and orbicular.

Polythalamous. Having many chambers.

Posteally. At the back, behind.

Posterior. The side of the shell in Bivalves, opposite to that on which the ligament is placed. (See *Anterior.*)

Punctured. Pierced with small holes.

Recurved. Turned backwards. The canal of some species of the genera *Strombus* and *Cerithium* is remarkably so.

Reflected. Turned or folded backwards, as in the thickened lip of the common *Helix.*

Retractile. Capable of being drawn backwards.

Retuse. When a spiral shell is retuse, the inner whorls appear to have been pressed into the body of the shell, and the *apex* is below the level of the last whorl.

Reversed. The same as *sinistral.* (See *Sinistral.*)

Rhombic. Quadrangular, four-sided.

Septum. A division.

Serrated. Edged like a saw.

Sessile. Attached, without a stalk or peduncle.

Setaceous. Bristly with hairs.

Sinistral. Having the aperture on the *left* side, as opposed to *dextral* (see *Dextral*), also called *reversed.*

Sinuous. Waved.

Sinus. A gutter, or curvature.

Siphon. A fleshy pipe.

Siphuncle. A siphon, or tube.

Spathulate. Spoon-shaped.

Spire. Those volutions of a spiral shell which are above the lowest or body whorl collectively form the *spire* of the shell, whatever shape it may assume. The variations in the form of this part are numerous. In some it is excessively lengthened; in others it is not even raised above the body whorl. In *Planorbis* the spire is sunk, while in *Cypræa* it is so small as only to be seen when the shell is young, after which it is covered over by the enlargement of the body whorl or principal volution.

Stellated. With rays like a star.

Striated. Marked with lines, either raised or not, at parallel and nearly equal distances.

Sub. Almost, or approaching to; as sub-fusiform (nearly fusiform), &c.

Subulate. Awl-shaped.

Sustentacula. Under tentacula.

Sutures. The corkscrew line formed in the spire, by the whorls wrapping over each other.

Tentacula. Arms or feelers.

Terebrating Testacea. Such as take up their habitations in other substances, as *Pholas*, &c.

Testaceous. Composed of the materials which constitute shell.

Transverse. See *Longitudinal.*

Truncated. Cut short off, or ending abruptly.

Tuberculated. Covered with small protuberances.

Turbinate. Having the body of the shell large or swollen, and the spire comparatively short.

Turreted. Having the whorls gradually decreasing, so as to form a fine point at the *apex.*

Umbilicus. A small hollow, or sometimes a deep hole, on the side of the inner lip in spiral shells, formed by the inner edges of the whorls not touching each other: in some genera, as *Scalaria* and *Solarium*, it is so deep as to extend to the *apex* of the shell; in others, as *Trochus*, it is small; in *Bulimus* it becomes nearly

obsolete; and in *Natica* it is often entirely concealed by the spreading of the inner lip.

Umbones. The bosses in Bivalves.

Uncini. Hooks, or bent spines.

Varices. Longitudinal raised bands or ridges, which occur at regular distances in some Univalves, as *Murex*, *Triton*, &c. They mark the progressive enlargement of the shell, being the remnants of former apertures, beyond which the animal, as it increases in size, forms another aperture.

Ventral. Belonging to the stomach.

Ventricose. Swollen, or bulging out.

Vermiform. Worm-shaped.

Some of these explanations are taken from Mr. Swainson's *Malacology*.

GENERAL INDEX.

The Synonyms and Sub-genera are in Italics.

Abra, 230.
Abralia, 31.
Acanthina, 72.
Acanthoteuthis, 31.
Acardo, 157. 347.
Acera, without a horn, 167.
Acera, 168.
Achatina, an agate, 184.
Achatinella, diminutive of Achatina, 184.
Achtinoconchus, 336.
Acicula, 198. 161.
Aclesia, 161.
Aclis, without glory (mean), 128.
Acmæa, ditto, 134.
Acmæacea, 133.
Acme, a point, 198.
Acroculia, 121.
Acrotreta, 336.
Actæon, the grandchild of Cadmus, 169.
Actæonella, diminutive of Actæon, 170.
Actæonina, 202.
Actita, 121.
Acus, 77.
Adacna, 262.
Adamsiella, 196.
Adeorbis, I go, and round, 103.
Admete, a sea nymph, 78.
Ænigma, a riddle, 324.
Æolidiacea, 201.
Æolis, 201.
Ætheria, 292.
Ætheriacea, 291.
Ægires, 201.
Agaronia, 86.
Alasmodonta, 289.
Alderia, 202.
Alicula, a tunic, 166.
Allorisma, changeable, and support, 248.
Alycœus, 196.
Amalthea, 121.
Amathina, 122.
Amaura, blind, 113.
Ambonychia, a raised border, and nail, 307.
Ammonitacea, 44.
Ammonites, Ammon, a name of Jupiter, 44.
Amphibola, doubtful (as a genus), 194.
Amphibolacea, 194.
Amphichœna, on both sides, and to gape, 224.
Amphidesma, 229.
Amphidonta, 320.
Amphipeplea, around, and mantle, 191.
Amphisphyra, both sides, and a hammer, 163.
Amplexa, 192.
Ampullacera, 194.
Ampullaria, a round vessel, 199.
Ampullariacea, 199.
Anatina, belonging to a duck, 239.
Anatinacea, 238.
Anatinella, diminutive of Anatina, 242.
Anatomus, a cut, or notch, 145.
Ancillaria, a maiden, 86.
Ancistrocheirus, 31.
Ancistroteuthis, 31.
Ancula, 201.
Ancyloceras, incurved, and a horn, 45.
Ancylopoda, 328.

Ancylotus, 99.
Ancylus, a little horn, or handle, 193.
Anguinaria, 131.
Angystoma, 180.
Anodonta, without teeth, 289.
Anomalocardia, 222.
Anomia, without a name, 323.
Anomphala, 112.
Anostoma, above, and mouth, 180.
Aplustrum, a flag, 162.
Aplysia, not to be cleansed, 160.
Aplysiacea, 160.
Aporrhaidea, 56.
Aporrhais, an ancient name, 56.
Arca, a case, or box, 278.
Arcacea, 278.
Architectoma, 106.
Archonta, 209.
Arcinella, diminutive of Arca, 249.
Arenaria, 229.
Argiope, 334.
Argonauta, the ship Argo, and a sailor, 27.
Artemis, one of Diana's names, 222.
Artemon, 174. 180.
Arytœna, 259.
Ascoceras, a leathern bottle, and a horn, 41.
Aspergillum, to sprinkle, 259.
Assiminea, 103.
Assula, 167.
Astartacea, 273.
Astarte, the Assyrian Venus, 273.
Astralium, starry, 141.
Atagema, 201.
Athyris, 336.
Atlanta, the daughter of Atlas, 204.
Atlanta, 213.
Atlantacea, 204.
Atlas, the bearer of the heavens, 169.
Atrypa, 336.
Atys, the favourite of Cybele, 165.
Aulonotreta, 346.
Aulopoma, 196.
Aulosteges, 341.
Auricula, the ear, 188.
Auriculacea, 188.
Auriscalpium, 239.
Avellana, 124.
Avicula, a bird, 304.
Axinus, 269.
Axygyrus, sharp and circular, 205.

Bactrites, 43.
Baculites. a staff, 47.
Balantium, a bag, or purse, 210.
Balea, speckled, 186.
Bankivia, after the Bankivian hen, 144.
Barnea, 254.
Bela, 61.
Belemnitacea, 35.
Belemnites, a dart, 36.
Belemnosepia, 35.
Belemnoteuthis, a dart, and cuttle fish, 35.
Bellerophon, a hero of the Grecian mythology, 205.
Beloptera, a dart, and a wing, 35.
Beloteuthis, a dart, and cuttle fish, 35.
Bembicium, 105.
Biapholius, 236.
Bicatellus, 118.
Biconia, 118.
Bifrontia, two, and front, 106.
Bolma, 141.
Bombyxinus, 99.
Bornella, 201.
Bornia, 269.
Borsonia, after M. Borsoni, 61.
Bouchardia, after M. Bouchard, 330.
Bourciera, 196.
Brachiopoda, arms and feet, 324.
Brachychlanis, 201.
Brachythiris, 335.
Brocchia, after M. Brocchi, 122.
Brochus, 132.
Broderipia, after Mr. Broderip, 145.
Brownia, 205.
Bucania, a trumpet, 206.
Bucardium, 263.
Buccinanops, 76.
Buccinum, a trumpet, or horn, 76.
Buchannania, after Mr. Buchannan, 171.
Bulimus, 181.
Bulla, a bubble, or bladder, 164.
Bullacea, 162.
Bullœa, 168.
Bullia, 76.
Bullidium, 168.
Bullina, 162, 163.
Bullinula, diminutive of Bulla, 164.
Bursatella, 161.
Busiris, 161.
Byssanodonta, Byssus, and without teeth, 298.
Byssoarca, 279.
Byssomya, 236.

Cadulus, diminutive of Cadus, a barrel, 157.
Calcar, a spur, 140.
Calcarella, diminutive of Calcar, 115.
Calceola, a little shoe, 343.

Calliopea, 201.
Callopoma, 139.
Calypeopsis, 118.
Calyptræa, 118, 119, 120.
Calyptræacea, 118.
Cameroceras, 43.
Camerophoria, 339.
Camptoceros, bent, and a horn, 193.
Campulites, 42.
Campylanaus, 213.
Cancellaria, cross barred, 77.
Caprina, 348.
Caprinella, 350.
Caprinula, 349.
Caprotina, 349.
Caprotinadæ, 349.
Capsa, a box, 227. 233.
Capsula, 227.
Capulus, a handle, 121.
Caracolla, 174.
Cardiacea, 261.
Cardilia, a heart, 228.
Cardinia, a heart, 274.
Cardiomorpha, a heart, and figure, 264.
Cardiopoda, heart, and foot, 204.
Cardissa, 262.
Cardita, a heart, 276.
Carditacea, 275.
Cardium, a heart, 261.
Carinaria, a keel, 203.
Carinaropsis, a keel, and appearance, 154.
Carolia, after Prince Carl Buonaparte, 321.
Carychium, 189.
Cassidacea, 78.
Cassidaria, 80.
Cassidula, 189.
Cassidulus, 65.
Cassis, a helmet, 79.
Castalia, a spring on Parnassus, 288.
Cataulus, 196.
Catillus, 137.
Catillus, 310.
Cavolinia, after Cavolini, a Neapolitan naturalist, 209.
Cavoliniacea, 209.
Cemoria, 118. 150.
Centrifugus, 143.
Cephalopoda, head, and foot, 23.
Ceratophora, horn, and to carry, 204.
Ceratosoma, 201.
Cercomya, 239.
Cernina, 112.
Cerithium, a small horn, 95.
Chœna, 258.
Chalidis, 202.
Chama, on the ground, 264.
Chamacea, 264.
Chamostræa, Chama, and ostræa, 265.
Chelinotus, 92.
Chemnitzia, 126.
Chenopus, 56.
Chilina, from Chili, 190.
Chione, 222.
Chironia, after Capt. Chiron, 269.
Chiton, a coat of mail, 154.
Chitonacea, 154.
Chlorostoma, 142.
Choanopoma, 196.
Chondropoma, 196.
Chondrosepia, 33.
Chonites, 341.
Choristites, 335.
Choristodon, 237.
Choristoma, 198.
Cimber, 137.
Cingula, 100.
Cinulia, 124.
Circe, 222.
Cirribranchiata, 156.
Cirroteuthis, Cirrus, and cuttle fish, 27.
Cirrus, a curl, 146.
Cistula, 196.
Cittarium, 143.
Clanculus, 142.
Clathrodon, 234.
Clathrus, 107.
Clausaria, 257.
Clausilia, a valve or folding door, 187.
Clavagella, a little club, 259.
Clavatula, a club, 60.
Cleidophorus, to close, and to carry, 252.
Cleidothœrus, 265.
Clementia, 222.
Cleodora, 209.
Clepsydra, 259.
Clio, one of the Muses, 209.
Cliodita, 214.
Clionacea, 214.
Clione, 214.
Clithon, 137.
Cloelia, 201.
Cloisonnaria, 257.
Clotho, one of the Fates, 238.
Clymenia, Clymene, a sea nymph, 41.
Clypeolum, 137.
Cobresia, 174.
Cochlidium, 64.
Cochlodesma, a mollusc or snail, and band, 242.
Cochlohydra, 175.

Cœcacea, 131.
Cœcalium, 132.
Cœcum, a blind, or closed sack, 132.
Coleoprion, a sheath, and a coffin, 211.
Coltonia, 139.
Columbella, diminutive of columba, a dove, 73.
Columbellina, diminutive of columbella, 73.
Conchifera, shell, and to bear, 214.
Concholepas, a shell, and limpet, 70.
Conea, 57.
Congeria, 297.
Conocardium, cone, and cardium, 263.
Conoceras, 43.
Conopleura, cone, and side, 61.
Conoteuthis, cone, and cuttle fish, 35.
Conovulus, 189.
Conularia, a cone, 211.
Conus, a cone, 57.
Corbis, 267.
Corbula, a little basket, 244.
Corbulacea, 243.
Coretus, 192.
Coriocella, 92.
Coriocellacea, 92.
Cornea, 232.
Corona, 137.
Cranchia, after Mr. Cranch, a naturalist, 31.
Crania, a skull, 344.
Craniadæ, 343.
Craspedopoma, 196.
Craspedotus, 142.
Crassatella, crassus, thick, 274.
Crassina, 273.
Crenatula, somewhat grooved, 309.
Crenella, a small notch, 295.
Crepidula, a small slipper, 120.
Creseis, 210.
Crioceras, a ram, and horn, 45.
Crucibulum, a small crucible, 118.
Crypta, 120.
Cryptoceras, 41.
Cryptodon, 246. 269.
Cryptophthalmus, hidden, and eyes, 166.
Cryptostoma, 112.
Cryptothyra, 92.
Ctenoconcha, 283.
Cucullæa, a cap, and hood, 279.
Cultellus, 251.
Cumingia, after Mr. Cuming, 229.
Cuneus, 222.
Cuphus, crooked, 257.
Cuspidaria, 244.
Cuviera, 211.
Cyamium, a small bean, 271.
Cyanogaster, 159.
Cycladina, 270.
Cyclas, round, 232.
Cyclobranchiata, 152.
Cyclophorus, 196.
Cyclostoma, round, and mouth, 195.
Cyclostoma, 140.
Cyclostomacea, 195.
Cyclothyrus, 338.
Cyclotus, 196.
Cylichna, a little cup, 163.
Cylindrella, Cylindrical, 186.
Cylindrites, a cylinder, or roller, 171.
Cyllene, a mountain in Arcadia, 75.
Cymba, 84.
Cymbulia, a boat, 212.
Cymbuliacea, 211.
Cymodocea, the name of a nymph, 214.
Cypræa, the Greek for Venus, 88.
Cypræacea, 88.
Cypricardia, 276.
Cyprina, one of the names of Venus, 223.
Cyrena, a town in Africa, 231.
Cyrenella, 233.
Cyrenoida, Cyrena, and image, 233.
Cyrtia, 336.
Cyrtoceras, a curved form, and a horn. 42.
Cyrtodaria, 248.
Cyrtolites, curved, or hump-backed, 144.
Cytheria, 221.

Dactylus, 169.
Daphnella, a Greek nymph, 60.
Daudebardia, after M. Daudebard, 174.
Davidsonia after Mr. Davidson, 342.
Decapoda, ten, and feet, 30.
Defrancia, after M. Defrance, 60.
Defrancia, 61.
Delphinula, a dolphin, 140.
Delphinus, 140.
Delthyris, 335.
Demoulia, 75.
Dendronotus, 201.
Dentalium, a tooth, 156.
Deplommatina, 196.
Deridobranchus, neck, and gills, 152.
Dermatobranchus, 202.
Deshayesia, after M. Deshayes, 112.
Diadora, 150.
Dianchora, 316.
Dibaphus, two, and coloured, 54.
Dibranchiata, two, and gills, 25.
Diceras, double and horn, 265.
Didacna, 262.
Diloma, 142.

Dimyaria, 220.
Diodonta, 236.
Dione, 222.
Diplodonta, double, and tooth, 267.
Diplommatina, 196.
Dipsas, 290.
Discina, 345.
Discinidæ, 344.
Dispotæa, double, and drinking cup, 118.
Ditremaria, 146.
Dolabella, 161.
Dolium, a tun, 81.
Dombeya, 190.
Donacilla, diminutive of Donax, 228.
Donax, a reed, or tube, 223.
Doridiacea, 201.
Doridium, diminutive of Doris, 168.
Doris, 201.
Dosinia. 222.
Doto, 201.
Dreyssena, after M. Dreyssen, 296.
Duvaucelia, 201.

Eburna, ivory, 81.
Ecculiomphalus, 143.
Edmondia, after M. Edmond, 248.
Egeria, 231.
Eidothea, 168.
Elasmatina, 187.
Elysia, 202.
Emarginula, out of the border, and notched, 149.
Embla, 230.
Endoceras, 43.
Engina, *Enzina*, 73.
Enoploteuthis, 31.
Entodesma, within, and band, 243.
Erato, one of the Muses, 91.
Ervilia, 244.
Erycina, one of the names of Venus, 230.
Erycina, 269.
Euchelus, 142.
Eulima, safe harbour or refuge, 128.
Eulimacea, 127.
Euomphalus, large or wide, and umbilicus, 143.
Euridice, 205.
Eurybia, daughter of Pontus, and Gæa, 212.
Eutropia, 138.
Exogyra, the outside, and round, 320.

Fasciolaria, a little band, 63.
Faunus, 99.
Ferussina, after M. Ferussac, 196.
Ficula, a fig, 64.
Fidenas, 33.
Fimbria, a fringe, 267.
Firola, 204.
Fissurella, a little slit, 151.
Fissurellacea, 149.
Fissurellidea, 151.
Fissurirostra, 333.
Forsar, 102.
Fossarus, a name given by Adanson, 102
Fucicola, 202.
Furcella, 257.
Fusus, a spindle, 62.
Fusus, 54.

Galatea, the name of a sea-nymph, 231.
Galeomma, a weasel, and eye, 272.
Galeommacea, 272.
Galericulum, 113.
Galerus, a furred cap? 120.
Galileja, 232.
Gardinia, a name given by Adanson, 133.
Gari, 226.
Gasteropoda, 48.
Gastrana, 237.
Gastrochæna, stomach, and to gape, 258.
Gastrochænacea, 257.
Gastroplax, 157.
Gastropteron, stomach, and wing, 168.
Gellina, 201.
Geomalacus, the earth, and soft or light, 172.
Geomelania, the earth, and black, 198
Gervillia, after Gerville, a naturalist, 310.
Glauconella, glaucus, blue-green, 166.
Glauconome, a Nereid, 234.
Glaucus, 201.
Globiconcha, globose, and shell, 125.
Globularia, 112.
Globulus, globular, 141.
Glycimeris, 248.
Gnathodon, jaw, and tooth, 234.
Goldfussia, after M. Goldfuss, 263.
Gomphoceras, a club, and a horn, 42.
Gonambonites, 342.
Gonatus, 32.
Gonioceras, 43.
Goniclis, 152.
Goniodoris, 201.
Goodallia, 273.
Grateloupia, after M. Grateloupe, 224.
Gryphæa, a griffin, 320.
Gryphus, 332.
Guildfordia, 141.
Gulnaria, 191.
Gymmosomata, 214.

Gypidia, 339.
Gyroceras, a circle, and horn, 41.

Halia, the daughter of Nereus, 185.
Haliotis the sea, and an ear, 146.
Haminea, 165.
Hamites, a hook, 46.
Harpa, a harp, 87.
Harpax, 317.
Haustator, 93.
Helcion, 154.
Helicarion, 174.
Helicea, 174.
Helicina, 141.
Helicina, from Helix, 197.
Helicoceras, a spiral, and horn, 48.
Helicolimax, 174.
Heliconoides, 213.
Helicophanta, 174.
Helicophlegma, 205.
Helicophora, 213.
Helicopsis, 174.
Helicteres, 184.
Helictopoda, 335.
Helix, a spiral, 175.
Helixarion, 174.
Hemiperonites, 342.
Hemithyris, 338.
Hermæa, 201.
Heterofusus, 213.
Heteromyaria, 293.
Heteropoda, 201.
Heteroteuthis, 32.
Hexabranchus, 201.
Hiatella, 236.
Himantopoda, 308.
Hinnites, 311.
Hippochœta, 309.
Hippocrene, 54.
Hipponyx, 122.
Hippopodium, a horse, and foot, 298.
Hippopus, a horse, and foot, 303.
Hippurites, 349.
Hippuritidæ, 348.
Histioteuthis, sail, and cuttle fish, 31.
Holopea, whole, and opening, 100.
Hyalæa, 209.
Hyalina, 174.
Hydatina, 162.
Hypobranchæa, 202.
Hypothyris, 338.
Hypterus, 204.
Hyria, 288.

Icarus, after Icarus, the son of Dædalus, 161.
Ichthyosarcolithes, 350.
Ictis, 202.
Idalia, 201.
Idothea, 267.
Imperator, 141.
Incilaria, a little gutter, 172.
Infundibulum, 119.
Inoceramus, a dish, or cup, 310.
Iphigenia, the daughter of Agamemnon, 233.
Iridina, the rainbow, 290.
Isocardia, equal, and heart, 263.
Itieria, after M. Itieri, 170.

Jamaicia, 196.
Jaminea, 126.
Janella, 172.
Janthina, violet colour, 108.
Janthinacea, 108.
Janus, 201.
Jataronus, 264.
Jeffreysia, after Mr. Jeffreys, 101.
Jo, 99.
Jothea, *Jothea*, 134.
Jouannetia, after Jouannet, 254.

Kellia, after Mr. O'Kelly, 269.
Klitambonites, 342.

Labio, 142.
Lacuna, a fissure, or pit, 102.
Ladas, 205.
Laguncula, small bottle, 113.
Lamellaria, 92. 159.
Lampana, 96.
Lampas, 338.
Lanistes, 295.
Lasea, 270.
Laternula, 239.
Lavignon, 229.
Leachea, 31.
Leda, the mother of Castor and Pollux, 282.
Leiodoma, 76.
Leonia, 196.
Leucostoma, 100.
Lepeta, 134.
Leptæna, 341.
Leptagonia, 343.
Leptoconchus, thin, and shell, 71.
Lepton, delicate, weak, 270.
Leptopoma, 196.
Leptoteuthis, thin, and cuttle fish, 34.
Lepas, 152.
Leucostoma, 100.

Leucotis, 115.
Libitina, 276.
Licina, 196.
Ligula, 242.
Lima, a file, 312.
Limacea, 171.
Limacina, from Limax, 213.
Limacina, 174.
Limacinacea, 213.
Limax, an old name for a slug, 172.
Limea, from lima, 213.
Limnæa, mud, 190.
Limnæacea, 190.
Limnophysa, 191.
Limoarca, 313.
Limopsis, Lima, and appearance, 281.
Lingula, a tongue, 346.
Lingulidæ, 346.
Liotia, 139.
Liria, 133.
Listera, 229.
Lithedaphus, 119.
Lithidion, 196.
Lithodomus, 296.
Lithophaga, 235.
Lithophagus, stone, and to eat, 296.
Lithopoma, 141.
Litiopa, simple, and aperture, 99.
Litorina, the sea-shore, 104.
Lituites, a crooked staff, 41.
Lobaria, 168.
Lobiger, a lobe, and I bear, 162.
Loligo, the Latin name for cuttle fish, 32.
Loligopsis, Loligo, and opsis, like, 31.
Lomanotus, 202.
Lophocercus, the crest, and tail, 161.
Lottia, 134.
Loxostoma, 100.
Lucidella, 197.
Lucina, the name of a goddess, 266.
Lucinacea, 266.
Lutraria, mud, 245.
Lutricola, 245.
Lychnus, 188.
Lyonsia, 240.
Lyrodesma, lyre, and band, 284.
Lyrodon, lyre, and tooth, 284.

Machra, 251.
Machroschisma, 151.
Maclurites, 143.
Macrocheilus, long, and lip, 100.
Mactra, a kneading-trough, 227.
Mactrina, 273.
Magas, 330.
Magdala, 240.
Magilus, 130.
Malea, 81.
Malleacea, 303.
Malletia, after M. Mallet, 283.
Malleus, a hammer, 308.
Mangelia, after Mangeli, a Lombard, 60.
Maravignia, 102.
Margarita, 143.
Margaritina, a pearl, 289.
Marginella, a little rim or border, 91.
Marmarostoma, 139.
Marsenia, 92.
Martesia, 254.
Martinia, 337.
Megadesma, 231.
Megalodon, large, and tooth, 275.
Megaspira, large, and spire, 186.
Megathyris, 334.
Megalomastoma, 196.
Melafusus, 99.
Melampus, 189.
Melania, black, 98.
Melanopsis, 99.
Melas, 98.
Meleagrina, 305.
Melibœa, 201.
Melina, a sportsman's pouch, 309.
Mellea, 43.
Melo, 84.
Menestho, one of the Oceanidæ, 199.
Mercenaria, 222.
Meretrix, 222.
Mesodesma, 228.
Mitra, a bishop's head-dress, 84.
Mitrula, 137.
Mitrularia, a little cap, 118.
Modelia, 139.
Modiola, a little measure, 294.
Modiolaria, diminutive of Modiola, 295.
Modolopsis, Modiola, and appearance, 298.
Modulus, a measure, 105.
Monoceras, single, and horn, 72.
Monocondylæa, single, and knuckle-joint, 288.
Monodacna, 262.
Monodonta, 105.
Monomyaria, 301.
Monophora, one, and to bear, 206.
Monopleura, 349.
Monoptygma, one, and single fold, 126.
Montacuta, after Mr. Montague, 271.
Morio, a helmet, 80.
Moschites, a musky smell, 27.

Mouretia, 133.
Murchisonia, after Mr. Murchison, 95.
Murex, a sharp rock, 66.
Muricea, 62.
Mya, an ancient name for mussel, 246.
Myacea, 245.
Myalina, 307.
Mycetopus, mushroom, and foot, 291.
Myodora, probably made out of Mya and Pandora, 241.
Myochama, from Mya, and Chama, 243.
Myoconcha, Mya, and shell, 277.
Myoparo, 295.
Mysia, 267.
Mytilacea, 293.
Mytilimeria, Mytilus, and part, 297.
Mytilina, 297.
Mytilus, a mussell, 293.

Nacella, 154.
Nanina, 174.
Narica, the old name for a sea-snail, 115.
Naricacea, 115.
Nassa, a net, 74.
Natica, a swimmer, 111.
Naticacea, 111.
Naucum, 165.
Nautilacea, 38.
Nautilus, nauta, a sailor, 39.
Navicilla, a little ship, 137.
Necera, the name of a nymph, 244.
Nerea, 201.
Nerinea, 127.
Nerita, the ancient name of a sea-snail, 135.
Neritacea, 135.
Neripteron, 137.
Neritina, 137.
Neritopsis, a sea-nymph, and appearance, 116.
Nicania, 273.
Nina, 105.
Notarchus, the back, 161.
Nototrema, back, and opening, 156.
Nucleobranchiata, 203.
Nucula, a little nut, 281.
Nuculacea, 281.
Nuculina, diminutive of Nucula, 282.
Nudibranchia, 201.

Obolus, 346.
Octopoda, eight, and feet, 25.
Octopotenthis, 31.
Octopus, 26.
Odontidium, 132.
Odontina, 132.
Odontostoma, 181.
Odontostoma, a tooth, and mouth, 126.
Odostoma, 126.
Oligyra, 197.
Oliva, an olive, 85.
Olivacea, 85.
Olivella, 86.
Ommastrephes, the face, and to turn, 32.
Omphalius, 143.
Omphalotropis, 196.
Omphiscola, 191.
Onchidella, diminutive of Oncidium, 171.
Oncidiacea, 171.
Oncidium, 171.
Oniscia, a wood-louse, 80.
Onychia, 31.
Onycoteuthis, a claw, and cuttle-fish, 31.
Ophicardelus, 189.
Opiptera, 168.
Opis, 277.
Orbicella, 345.
Orbicula, 344, 345.
Orbis, an orb, 103.
Oris, 171.
Orthambonites, 342.
Orthisina, 342.
Orthis, 342.
Orthoceras, straight, and a horn, 42.
Orthoceratites, 349.
Orthonota, straight-lined, and back, 280.
Orthostelis, 126.
Orthotites, 342.
Osilinus, 142.
Osteodesma, 240.
Ostracea, 317.
Ostræa, an ancient name for a shell-fish, 317.
Otopoma, 196.
Ovula, diminutive of ovum, an egg, 91.
Oxygyrus, 205.
Oxynoë, 169.
Oxynoë, 92. 112, 113.
Oxystele, 142.

Pachymya, thick, and shell-fish, 311.
Pachyodon, 274.
Pachypoma, 141.
Pachytes, 316.
Paludina, a marsh, 97.
Paludinacea, 96.
Paludomus, 99.
Pamaulax, 141.
Pandora, the wife of Epimetheus, 241.
Pandorina, 240.
Panopæa, a Nereid, 247.

Parmacella, a little shield, 172.
Parmophorus, 150.
Parthenia, 126.
Parthenope, 272.
Parthenopea, 168.
Partula, 174.
Patella, a dish or platter, 152.
Patellacea, 152.
Patelloidea, 134.
Paxyodon, 288.
Pecten, a comb, 314.
Pectinibranchiata, 51.
Pectinacea, 311.
Pectunculus, diminutive of Pecten, 280.
Pedicularia, a louse, 123.
Pedipes, a double foot, 189.
Pedum, the broad end of an oar, 311.
Pelagia, the deep sea, 214.
Pelvis, 301.
Pentamerus, five parts, 340.
Peracle, 213.
Perdix, 81.
Periploma, to sail about, 239.
Perna, 309.
Peronia, after Perron, 171.
Perothis, 31.
Perrona, 60.
Petricola, stone, and to live in, 237.
Phasianella, a pheasant, 138.
Phasianella, 104.
Phasianema, 102.
Phasianus, 138.
Philine, 168.
Philomycus, a lover of mushrooms, 172.
Pholadea, 252.
Pholadidia, 254.
Pholadomya, Pholas and Mya, 247.
Pholadopsis, 254.
Pholas, an ancient name, 253.
Pholeobius, 236.
Phorcus, 143.
Phos, 75.
Phosphorax, 172.
Phragmoceras, a partition, and a horn, 42.
Phyllidia, 202.
Phyllidiacea, 201.
Phyllirrhoë, 206.
Phyllirrhoacea, 206.
Physa, a bubble, 192.
Physopsis, Physa, and appearance, 192.
Pileolus, a little cap, 137.
Pileopsis, 121.
Pinna, the fin, 299.
Pinnacea, 298.
Pinnoctopus, fin, and eight-footed, 27.
Pinnogena, Pinna, and I produce, 300.
Pisania, from Pisani, an Italian, 74.
Pisidium, a little pea, 232.
Pisum, 232.
Pitidium, 134.
Pitonillus, 197.
Placenta, 321.
Placobranchiacea, 201.
Placobranchus, 202.
Placuna, a cake, 321.
Placunanomia, Placuna, and Anomia, 322.
Planaxis, flat, and axis, 99.
Planorbis, flat, and orb, 192.
Planulites, 41.
Plectambonites, 341.
Plectrophorus, a shield, and to bear, 173.
Pleurobranchæa, 159.
Pleurobranchea, 157.
Pleurobranchidium, 159.
Pleurobranchus, side and gill, 159.
Pleurophyllidia, 202.
Pleurotoma, the side, and a slit, 59.
Pleurotomacea, 59.
Pleurotomaria, side, and slit, 145.
Plicatula, plicated, 317.
Plocamophorus, 201.
Pneumodermacea, 214.
Pneumodermon, breath, and cuticle, 214.
Pododismus, the foot, and a band, 321.
Podopsis, 316.
Pollia, 74.
Polycera, 201.
Polyodonta, 142. 188. 231.
Polypus, many-footed, 26.
Pomatias, 196.
Porcellana, 91.
Porcellia, a little pig, 206.
Poromya, 245.
Poronia, 270.
Posydonomya, Neptune, and Mya, 308.
Posteriobranchæa, behind, and gills, 159.
Potamides, 96.
Potamomya, 244.
Potamophila, 190. 231.
Priamus, 185.
Proctonotus, 201.
Productidæ, 340.
Productus, 340.
Pronites, 340.
Pronoë, 274.
Propilidium, 134.
Proserpina, daughter of Ceres, 181.
Proto, the first in order, 94.
Protocardia, the first or fore part, and heart, 262.

Psammobia, sand, and I live, 226.
Psammosolen, sand, and Solen, 251.
Psyche, the soul, or a butterfly, 212.
Pterinea, a wing, 306.
Pteroceras, a wing, and a horn, 52.
Pterochilus, 201.
Pterocyclus, 196.
Pterodonta, a wing, and toothed, 55.
Pteropoda, wing, and foot, 207.
Pterosoma, a wing, and body, 206.
Pteroteuthis, 32.
Pterotrachæa, a wing, and windpipe, 204.
Ptychoceras, a fold, and a horn, 46.
Pugiunculus, a little dagger, 211.
Pulmonata, 171.
Pulvinites, 311.
Puncturella, 150.
Pupa, a chrysalis, 185.
Pupillia, 151.
Pupina, diminutive of Pupa, 196.
Pupinella, 196.
Pupula, 198.
Purpura, purple, 69.
Purpuroidea, from Purpura, 71.
Pyramidella, a little pyramid, 125.
Pyramidellacea, 125.
Pyramis, 142. 199.
Pyrgelix, 186.
Pyrgiscus, 126.
Pyrula, a little pear, 65.
Pythia, 188, 189.
Pythina, 269.

Quoya, after M. Quoy, 100.

Radiolites, 347.
Ranella, a frog, 68.
Rangia, 234.
Realia, 196.
Rhaphistoma, a suture, and mouth, 143.
Rhegostoma, 196.
Rhomboides, 236.
Rhynchomya, 239.
Rhynconella, 338.
Rhynconellidæ, 338.
Ricinula, from the resemblance to the seed-vessel of the Ricinus, 72.
Rimella, 54.
Rimula, a small fissure, 150.
Rinella, 139.
Ringicula, gaping, 124.
Ringiculacea, 123.
Ringinella, 124.
Risella, 105.
Rissoa, after M. Risso, 100.
Rissoella, ditto, 128.
Rissoina, diminutive of Rissoa, 101.
Rossia, 32.
Rostellaria, a little beak, 54.
Rostrotrema, a beak, and a hole, 55.
Rotella, 141.
Rudistæ, 347.
Rudolphia, 72.
Rupellaria, a rock, 237.

Sabia, 122.
Sagitta, an arrow, 206.
Sagittacea, 206.
Sagitella, a little arrow, 206.
Sandalium, 120.
Sanguinolaria, from blood, and colour, 226.
Sanguinolaria, 227.
Sarcopterus, 168.
Sarmaticus, 139.
Saxicava, stone, and hollow, 236.
Scacchia, after M. Scacchi, 268.
Scæa, 213.
Scalaria, a ladder or staircase, 107.
Scalariacea, 107.
Scalites, stairs, 143.
Scaphander, a skiff, and a man? 167.
Scaphites, a skiff, and stone, 45.
Scaphula, a little skiff, 280.
Scaphula, 86.
Scaphura, 280.
Scarabus, a beetle, 188.
Schizodus, split and tooth, 285.
Schizostoma, 106. 143.
Schizotreta, 345.
Scissurella, 145.
Scrobicularia, a dimple, 229.
Scutella, 145.
Scutellina, 154.
Scutibranchiata, 135.
Scutum, a shield, 150.
Scyllæa, 201.
Segmentina, 193.
Semele, the mother of Bacchus, 229.
Semiluna, 338.
Sepia, a name for the cuttle fish, 33.
Sepiacea, 31.
Sepiola, diminutive of Sepia, 33.
Sepioloidea, 32.
Sepioteuthis, Sepia, and cuttle fish, 33.
Septaria, 137. 257.
Seraphis, 55.
Serpula, 129.
Serpularia, 143.
Serpulorbis, 129.
Serripes, 262.

Sigapatella, 119.
Sigaretus, 92.
Sigaretus, name given by Adanson, 112.
Siliqua, 251.
Siliquaria, a pod, 131.
Sinemuria, 274.
Siphonaria, a channel, 133.
Siphonariacea, 132.
Siphonostoma, 186.
Siphonotreta, 345.
Siphopatella, 118.
Sissurella, 145.
Sistrum, 72.
Skenea, after Dr. Skene, 103.
Solarium, a staircase, or gallery, 106.
Solecurtus, 251.
Solen, an ancient name, 250.
Solenacea, 249.
Solenella, 283.
Solenomya, Solen and Mya, 278.
Solenomyacea, 277.
Solidula, 169.
Speo, 169.
Sphæra, a ball, 317.
Sphærium, 232.
Sphærulites, 347.
Sphenia, 244.
Spinigera, a spine, 55.
Spiralis, 213.
Spiratella, 213.
Spiracella, whorled, 123.
Spirifer, 335.
Spiriferidæ, 335.
Spirula, diminutive of Spira, 37.
Spirulirostra, 37.
Spondylus, an ancient name, 316.
Spongiobranchæa, sponge, and gills, 214.
Steira, 205.
Stenopus, 174.
Stiliger, 201.
Stoastoma, a pillared hall, and mouth, 197.
Stomatella, a little mouth, 144.
Stomatia, mouthed, 144.
Stomatia, 112.
Stomax, 144.
Strephona, 86.
Streptaxis, a twisted axis, 180.
Stringocephalus, 337.
Strobilus, 187.
Strombacea, 52.
Strombus, a twisted cone, 53.
Strophalosia, 340.
Strophomena, 343.
Strophostoma, 196.
Struthiolaria, an ostrich, 57.
Stylina, pointed, styliform, *Stylifer*, 110.
Stylinacea, 109.
Subula, 77.
Subulites, an awl, or piercer, 128.
Succinea, amber, 175.
Sutura, 309.
Sycotyphus, 64.
Syndosmya, 230.
Tapes, 222.
Tectibranchiata, 157.
Tectus, 105.
Tellina, the earth, 225.
Tellinacea, 220.
Tellinomya, Tellina, and Mya, 249.
Terebellum, 93.
Terebellum, an augur, 55.
Terebra, an augur, 77.
Terebratella, diminutive of Terebratula, 329.
Terebratula, bored, 331.
Terebratulidæ, 329.
Terebratulina, 332.
Terebrirostra, 332.
Teredina, diminutive of Teredo, 257.
Teredo, a piercer, 255.
Tergipes, 201.
Testacella, a little shell, 172.
Tethys, 201.
Tethys, a name for the sea, 222.
Tetrabranchiata, four, and gills, 38.
Tetraplodon, 288.
Teuthopsis, cuttle fish, and like, 34.
Thalassina, 275.
Thallicera, 194.
Thallopus, 161.
Theca, a sheath, 210.
Thecacera, 201.
Thecaphorus, 166.
Thecideadæ, 334.
Thecidium, a box, 334.
Thecosomata, 209.
Theodoxus, 137.
Thetis, 273.
Thracia, from Thrace, 240.
Thyasira, 269.
Thyreus, 123.
Tiedemannia, after Tiedemann, 212.
Timoriena, from Timor, 206.
Tomigerus, 180.
Tomigerus, 180.
Tomostoma, 137.
Tornatella, 169.
Tornatellina, diminutive of Tornatella, 187.
Toxoceras, a bow, and a horn, 47.
Trapezium, square, 276.
Trematis, 345.

Trichites, 300.
Trichocyclas, hair, and round, 214.
Trichogonia, 297.
Trichotropis, hair, and keel, 114.
Tricla, 209.
Tricolia, 138.
Tricula, 99.
Tridacna, 301.
Tridacnacea, 301.
Tridonta, 273.
Triforis, three, and doors, 96.
Trigonacia, 284.
Trigonia, 222. 284.
Trigonocœlia, 281.
Trigonotreta, 335.
Trimusculus, 133.
Triomphalia, 254.
Triopa, 201.
Triptera, three, and wing, 211.
Triton, 67.
Tritonia, 201.
Tritoniacea, 201.
Tritonium, from Triton, a sea-god, 67.
Trochacea, 138.
Trochatella, 197.
Trochita, a wheel, and round, 119.
Trochoceras, a hoop, and horn, 43.
Trocholites, 41.
Trochotoma, a top, and slit, 146.
Trochus, a hoop, 141.
Trochus, 104. 119.
Tropœum, 45.
Truncatella, truncated, 198.
Tubicanthus, 141.
Tudes, 308.
Tudora, 196.
Turbo, a top, 139.
Turbo, 104.
Turbinella, a little top, 63.
Turbonilla, little Turbo, 126.
Turrilites, a tower, 47.
Turritella, a little tower, 93.
Turritellacea, 93.
Tylodina, a boss, or hump, 158.
Tylostoma, a calosity, and mouth, 124.
Typhis, smoke, 67.

Umbraculum, 157.
Umbrella, a little shade, 157.
Uncites, 339.
Ungulina, a nail, or hoof, 268.
Ungulites, 346.
Unio, a pearl, 287.
Unionacea, 285.
Utriculus, 163.
Uvanilla, 141.

Vagina, 251.
Vaginella, a little sheath, 210.
Vaginula, 210.
Vaginulus, a sheath, 172.
Valvata, having valves, 107.
Vanicoro, 115.
Velates, 137.
Velutina, velvety, 113.
Velutinacea, 113.
Venericardia, 276.
Venerupis, 237.
Venus, the goddess of beauty, 221.
Vermetacea, 129.
Vermetus, a worm, 129.
Vermicularia, 129.
Veronicella, 172.
Vertigo, 174.
Viliersia, 201.
Villorita, 232.
Vitrella, 167.
Vitrina, glass, 174.
Vitrinella, diminutive of Vitrina, 140.
Vivipara, 97.
Viviparus, 97.
Voluta, a volute, to roll, 82.
Volutacea, 82.
Volvaria, a coil, 170.
Vulsella, drawn out, 306.

Xanthonella, yellow, 166.
Xenophora, foreign bodies, and to carry, 116.
Xenophoracea, 116.
Xylophaga, wood, and to eat, 255.

Yoldia, after Yoldi, a conchologist, 283.

THE END.

LONDON:
A. and G. A. SPOTTISWOODE,
New-street-Square.

Zool Dept
MOLLUSCA

ERRATA.

Page 11. for " Mytilus edulis," under cut, read " Unio."
25. line 15. for " Tectibranchiata" read " Tetrabranchiata."
133. for " Acmacacea," read " Acmæacea."
176. for " Helix," under cut, read " Helix pomatia."

24 APR 1928
PURCHASED

a. Russell
4/6.

AN ALPHABETICAL CATALOGUE

OF

NEW WORKS

IN GENERAL AND MISCELLANEOUS LITERATURE,

PUBLISHED BY

MESSRS. LONGMAN, BROWN, GREEN, AND LONGMANS,

PATERNOSTER ROW, LONDON.

CLASSIFIED INDEX.

Agriculture and Rural Affairs.

Pages

Bayldon on Valuing Rents, etc. - - 6
Caird's Letters on Agriculture - - - 8
Cecil's Stud Farm - - - - - 8
Loudon's Encyclopædia of Agriculture - 17
,, Self-Instruction for Farmers, etc. 17
,, (Mrs.) Lady's Country Companion 17
Low's Elements of Agriculture - - 18

Arts, Manufactures, and Architecture.

Addison's Knights Templars - - - 5
Bourne's Catechism of the Steam Engine 7
,, On the Screw Propeller - - 6
Brande's Dictionary of Science, etc. - 7
Cresy's Encyclo. of Civil Engineering - 8
Eastlake on Oil Painting - - - 9
Gwilt's Encyclopædia of Architecture - 11
Jameson's Sacred and Legendary Art - 14
Loudon's Rural Architecture - - - 18
Moseley's Engineering and Architecture 21
Steam Engine (The), by the Artisan Club 5
Tate on Strength of Materials - - - 29
Ure's Dictionary of Arts, etc. - - 30

Biography.

Baines's Life of Baines - - - - 6
Bunsen's Hippolytus - - - - 7
Foss's Judges of England - - - 10
Freeman's Life of Kirby - - - 10
Haydon's Autobiography, by Taylor - 29
Holcroft's Memoirs - - - - - 31
Holland's (Lord) Memoirs - - - 12
Lardner's Cabinet Cyclopædia - - 16
Maunder's Biographical Treasury - - 20
Memoir of the Duke of Wellington - 31
,, Lord Peterborough - - 23
Russell's Memoirs of Moore - - - 21
Southey's Life of Wesley - - - - 27
,, Life and Correspondence - 27
Stephen's Ecclesiastical Biography - 28
Taylor's Loyola - - - - - 29
,, Wesley - - - - 29
Townsend's Twelve eminent Judges - 30
Waterton's Autobiography and Essays - 30

Books of General Utility.

Acton's (Eliza) Cookery Book - - 5
Black's Treatise on Brewing - - - 6
Cabinet Gazetteer (The) - - - 7
,, Lawyer (The) - - - - 8
Hints on Etiquette - - - - - 12
Hudson's Executor's Guide - - - 13
,, On Making Wills - - - 13

Pages

Lardner's Cabinet Cyclopædia - - 16
Loudon's Self Instruction - - - 17
,, (Mrs.) Amateur Gardener - 17
Maunder's Treasury of Knowledge - - 20
,, Scientific and Literary Treasury 20
,, Treasury of History - - 20
,, Biographical Treasury - - 20
,, Natural History - - - 20
Pocket and the Stud - - - - 12
Pycroft's Course of English Reading - 24
Reece's Medical Guide - - - - 24
Rich's Companion to the Latin Dictionary 24
Riddle's Latin Dictionaries and Lexicon 24
Rogers's Vegetable Cultivator - - 25
Roget's English Thesaurus - - - 25
Rowton's Debater - - - - - 25
Short Whist - - - - - - 26
Stud (The) for Practical Purposes - - 12
Thomson's Interest Tables - - - 30
Traveller's Library - - - - - 31
Webster's Domestic Economy - - 32
Wilmot's Abridgment of Blackstone's Commentaries - - - - - 32

Botany and Gardening.

Conversations on Botany - - - 8
Hooker's British Flora - - - - 13
,, Guide to Kew Gardens - - 12
Lindley's Introduction to Botany - - 17
Loudon's Hortus Britannicus - - - 18
,, Encyclopædia of Trees & Shrubs 17
,, ,, Gardening - 17
,, ,, Plants - - 18
,, Self-Instruction for Gardeners 17
,, (Mrs.) Amateur Gardener - 17
Rivers's Rose Amateur's Guide - - 25
Rogers's Vegetable Cultivator - - 25

Chronology.

Blair's Chronological Tables - - - 6
Bunsen's Ancient Egypt - - - 7
Haydn's Book of Dignities - - - 12
Nicolas's Chronology of History - - 16

Commerce and Mercantile Affairs.

Francis's Bank of England - - - 10
,, English Railway - - - 10
,, Stock Exchange - - - 10
Lorimer's Letters to a Master Mariner - 17
M'Culloch's Dictionary of Commerce - 19
Steel's Shipmaster's Assistant - - 28
Symons' Merchant Seamen's Law - - 28
Thomson's Tables of Interest - - - 29

London: Printed by M. MASON, Ivy Lane, Paternoster Row.

Criticism, History, and Memoirs.

	Pages
Addison's Knights-Templars	5
Anthony's Footsteps to History	5
Balfour's Sketches of Literature	6
Belfast's English Poets	6
Blair's Chron. and Historical Tables	6
Burton's History of Scotland	7
Bunsen's Ancient Egypt	7
,, Hippolytus	7
Conybeare and Howson's St. Paul	8
Dennistoun's Dukes of Urbino	9
Eastlake's History of Oil Painting	9
Felice's French Protestants	10
Foss's Judges of England	10
Francis's Bank of England	10
,, English Railway	10
,, Stock Exchange	10
Gleig's Leipsic Campaign	31
Gurney's Historical Sketches	11
Hamilton's Essays from the Edinburgh Review	11
Haydon's Autobiography, by Taylor	29
Harrison On the English Language	11
Holland's (Lord) Foreign Reminiscences	12
,, ,, Whig Party	12
Jeffrey's (Lord) Contributions	14
Kemble's Anglo-Saxons in England	15
Lardner's Cabinet Cyclopædia	16
Macaulay's Essays	18
,, History of England	18
Mackintosh's Miscellaneous Works	18
M'Culloch's Dictionary, Historical, Geographical, and Statistical	19
Maunder's Treasury of History	20
Marriotti's Fra Dolcino	19
Martineau's Church History	20
Memoir of the Duke of Wellington	31
Merivale's Roman Republic	20
,, History of Rome	20
Moore's (Thomas) Memoirs, etc.	21
Mosheim's Ecclesiastical History	22
Mure's Greek Literature	22
Ranke's Ferdinand and Maximilian	31
Rich's Companion to the Latin Dictionary	24
Riddle's Latin Dictionaries	24
Rogers's Essays from the Edinburgh Rev.	25
Roget's English Thesaurus	25
St. John's Indian Archipelago	25
Schmitz's History of Greece	29
Sinclair's Popish Legends	26
Smith's (S.) Lectures on Moral Philosophy	27
Southey's The Doctor etc.	27
Stephen's Ecclesiastical Biography	28
,, Lectures on the History of France	28
Sydney Smith's Works	27
Taylor's Loyola	29
,, Wesley	29
Thirlwall's History of Greece	29
Townsend's State Trials	30
Turner's England during the Middle Ages	30
,, Anglo-Saxons	30
,, Sacred History of the World	30
Zumpt's Latin Grammar	32

Geography and Atlases.

	Pages
Butler's Ancient and Modern Geography	7
,, Atlas of General Geography	7
abinet Gazetteer (The)	7
Hall's Large Library Atlas	13
Hughes (E.) New School Physical Atlas	21
,, (W.) Australian Colonies	13
,, ,, Mathematical Geography	11
Johnston's General Gazetteer	14
M'Culloch's Geographical Dictionary	19
M'Leod and Weller's Scripture Atlas	18
Murray's Encyclopædia of Geography	21
Sharp's British Gazetteer	26

Juvenile Books.

	Pages
Amy Herbert	25
Anthony's Footsteps to History	5
Calling and Responsibilities of a Governess	8
Corner's Children's Sunday Book	8
Earl's Daughter (The)	25
Experience of Life (The)	10
Gertrude	26
Graham's Studies from the English Poets	11
Howitt's Boy's Country Book	13
,, Children's Year	13
Laneton Parsonage	26
Mrs. Marcet's Conversations	19
Margaret Percival	26
Pycroft's Course of English Reading	24

Medicine.

	Pages
Ancell On Tuberculosis	5
Bull's Hints to Mothers	7
,, Management of Children	7
Copland's Dictionary of Medicine	8
Holland's Mental Physiology	12
Latham On Diseases of the Heart	15
Moore On Health, Disease, and Remedy	21
Pereira On Food and Diet	23
Reece's Medical Guide	24
Thomas's Practice on Physic	28

Miscellaneous and General Literature.

	Pages
Calling, etc. (The) of a Governess	8
Carlisle's Lectures and Addresses	31
Eclipse of Faith (The)	9
Graham's English	11
Greg's Essays on Political and Social Science	11
Haydn's Beatson's Index	12
Holland's Medical Physiology	12
Hooker's Kew Guide	12
Howitt's Rural Life of England	13
,, Visits to Remarkable Places	13
Jeffrey's (Lord) Contributions	14
Lang On Freedom for the Colonies	15
Lardner's Cabinet Cyclopædia	16
London's (Mrs.) Lady's Country Companion	17
Macaulay's Critical and Historical Essays	18
Mackintosh's (Sir J.) Miscellaneous Works	18
Maitland's Church in the Catacombs	19
Memoirs of a Maître d'Armes	31
Pascal's Works, by Pearce	23
Pycroft's Course of English Reading	24
Rich's Companion to the Latin Dictionary	24
Riddle's Latin Dictionaries and Lexicon	24
Rowton's Debater	25
Seaward's Narrative of his Shipwreck	25
Sir Roger De Coverley	26
Sketches by a Sailor	26
Southey's Common-Place Books	27
,, The Doctor etc.	27

	Pages
Stow's Training System	28
Sydney Smith's Works	27
Townsend's State Trials	30
Willoughby's (Lady) Diary	32
Zumpt's Latin Grammar	32

Natural History in General.

Catlow's Popular Conchology	8
Doubleday, Westwood, and Hewitson's Butterflies	9
Ephemera and Young on the Salmon	10
Gosse's Natural History of Jamaica	11
Kemp's Natural History of Creation	31
Kirby and Spence's Entomology	15
Lee's Elements of Natural History	15
Maunder's Treasury of Natural History	20
Turton's Shells of the British Islands	30
Waterton's Essays on Natural History	30
Youatt's The Dog	32
,, The Horse	23

One Vol. Encyclopædias and Dictionaries.

Blaine's, of Rural Sports	6
Brande's, of Science, Literature, and Art	7
Copland's, of Medicine	8
Cresy's, of Civil Engineering	8
Gwilt's, of Architecture	11
Johnston's Geographical Dictionary	14
Loudon's, of Trees and Shrubs	17
,, of Gardening	17
,, of Agriculture	17
,, of Plants	18
,, of Rural Architecture	18
M'Culloch's Geographical Dictionary	19
,, Dictionary of Commerce	19
Murray's Encyclopædia of Geography	22
Sharp's British Gazetteer	26
Ure's Arts, Manufactures, and Mines	30
Webster's Domestic Economy	32

Poetry and the Drama.

Aikin's (Dr.) British Poets	5
Baillie's (Joanna) Poetical Works	5
Belfast's Lectures on the English Poets	6
Dante, by Cayley	8
Flowers and their Kindred Thoughts	22
Fruits from the Garden and Field	23
Goldsmith's Poems, illustrated	11
Goethe's Faust, by Falck Lebahn	15
Graham's Studies from the English Poets	11
Kippis's Hymns	15
L. E. L.'s Poetical Works	15
Linwood's Anthologia Oxoniensis	17
Macaulay's Lays of Ancient Rome	18
Montgomery's Poetical Works	20
,, Original Hymns	20
Moore's Irish Melodies	21
,, Lalla Rookh	21
,, Poetical Works	21
,, Songs and Ballads	21
Shakspeare, by Bowdler	26
,, 's Sentiments and Similes	14
,, 's Songs and Ballads	26
Southey's Poetical Works	27
,, British Poets	28
Swain's English Melodies	28
Thomson's Seasons, illustrated	29
Watts's Lyrics of the Heart	32
Winged Thoughts	22

Political Economy and Statistics.

	Pages
Banfield's Statistical Companion	6
Caird's English Agriculture	8
Francis's Bank of England	10
,, English Railway	10
,, Stock Exchange	10
Greig's Essays on Political and Social Science	11
Laing's Denmark and the Duchies	15
,, Notes of a Traveller	15
M'Culloch's Geographical, Statistical, and Historical Dictionary	19
M'Culloch's Dictionary of Commerce	19
,, London	31
,, On Taxation and Funding	19
,, Statistics of the British Empire	19
Marcet's Conversations on Polit. Economy	19
Pashley on Pauperism	23

Religious and Moral Works, etc.

Amy Herbert	25
Bloomfield's Greek Testament	6
,, Annotations on ditto	6
,, College and School ditto	6
Calling and Responsibilities of a Governess	8
Conybeare and Howson's St. Paul	8
Corner's Sunday Book	8
Dale's Domestic Liturgy	9
Discipline	9
Earl's Daughter (The)	25
Eclipse of Faith (The)	9
Englishman's Hebrew Concordance	10
,, Greek Concordance	10
Experience of Life (The)	10
Félice's French Protestants	10
Gertrude	26
Harrison's Light of the Forge	11
Hope's Brittany and the Bible	31
Hook's (Dr.) Lectures on Passion Week	12
Horne's Introduction to the Scriptures	13
,, Compendium of ditto	13
Jameson's Sacred and Legendary Art	14
,, Monastic Legends	14
,, Legends of the Madonna	14
Jeremy Taylor's Works	14
Kippis's Hymns	15
Laneton Parsonage	26
Letters to my Unknown Friends	17
,, on Happiness	17
Maitland's Church in the Catacombs	19
Margaret Percival	26
M'Leod and Weller's Scripture Atlas	18
Mariotti's Fra Dolcino	19
Martineau's Church History	20
Milner's Church of Christ	20
Montgomery's Original Hymns	20
Moore on the Power of the Soul	21
,, on the Use of the Body	21
,, on Man and his Motives	21
Mosheim's Ecclesiastical History	22
Neale's Risen from the Ranks	22
,, Closing Scene	23
,, Resting Places of the Just	22
,, Riches that bring no Sorrow	22
Newman's (J. H.) Discourses	22
Pascal's Works, by Pearce	23
Ranke's Ferdinand and Maximilian	31
Readings for Lent	14
Robinson's Lexicon of the Greek Testament	25
Saints our Example (The)	25

	Pages
Self-De al the Preparation for Easter	25
Sketches y a Sailor	26
Sinclair's Journey of Life	26
,, Popish Legends	26
Smith's (J.) St. Paul's Shipwreck	27
,, (S.) Lectures on Moral Philosophy	27
Southey's Life of Wesley	27
Stephen's (Sir J.) Ecclesiastical Biography	28
Tayler's (Rev. C. B.) Margaret	29
,, ,, Lady Mary	29
Taylor's (J.) Thumb Bible	29
,, (Isaac) Loyola	29
,, Wesley	29
Tomline's Introduction to the Bible	30
Turner's Sacred History	30
Willoughby's (Lady) Diary	32

Rural Sports.

Blaine's Dictionary of Rural Sports	6
Cecil's Stable Practice	8
,, Stud Farm	8
The Cricket Field	9
Ephemera on Angling	10
,, 's Book of the Salmon	10
Hawker's Instructions to Sportsmen	12
The Hunting Field	11
Loudon's Lady's Country Companion	17
Pocket and the Stud	12
Practical Horsemanship	11
Pulman's Fly-Fishing	24
Stable Talk and Table Talk	12
The Stud, for Practical Men	12
Wheatley's Rod and Line	32

The Sciences in General and Mathematics.

Bourne's Catechism of the Steam Engine	7
,, on the Screw Propeller	6
Brande's Dictionary of Science, etc.	7
Dela Beche on the Geology of Cornwall, etc.	9
,, 's Geological Observer	9
De la Rive's Electricity	9
Herschel's Outlines of Astronomy	12
Humboldt's Aspects of Nature	14
,, Cosmos	14
Holland's Mental Physiology	12
Lardner's Cabinet Cyclopædia	16
,, Great Exhibition	15
Lund's Companion to *Wood's Algebra*	32
Marcet's Conversations	19
Moseley's Practical Mechanics	22
,, Engineering and Architecture	22
Owen's Comparative Anatomy	23
Peschel's Physics	23
Phillips's Mineralogy	23
,, Palæozoic Fossils of Cornwall, etc.	24
Portlock's Geology of Londonderry	24
Smee's Electro-Metallurgy	27
Steam Engine (The), by the Artisan Club	5
Tate on Strength of Materials	28
,, Exercises on Mechanics	27
,, Mechanical Philosophy	28
Wood's Algebra, by Lund	32

Veterinary Medicine.

Cecil's Stable Practice	8
,, Stud Farm	8
The Hunting Field	11
The Pocket and the Stud	12
Practical Horsemanship	11
Stable Talk and Table Talk	12
The Stud for Practical Purposes	11
Youatt's The Dog	32
,, The Horse	32

Voyages and Travels.

Adams's Canterbury Settlement	5
Davis's China	9
Eöthen	31
Forbes's Dahomey	10
Forester and Biddulph's Norway	10
Hope's Brittany and the Bible	31
Hughes's Australian Colonies	31
Huc's Tartary, Thibet, and China	31
Humboldt's Aspects of Nature	14
Jameson's Canada	31
Jerrmann's Pictures from St. Petersburg	31
Lang's New South Wales	15
Laing's Denmark	15
,, Norway	31
,, Notes of a Traveller	15
Lardner's London, etc.	15
Osborn's Arctic Journal	22
Peel's Nubian Desert	23
Pfeiffer's Voyage round the World	31
Power's New Zealand Sketches	24
Richardson's Arctic Boat Voyage	24
Seaward's Narrative of his Shipwreck	25
Snow's Arctic Voyage	27
St. John's (H.) Indian Archipelago	25
,, (J. A.) Isis	25
Sutherland's Arctic Voyage	28
Traveller's Library	31
Werne's African Wanderings	31

Works of Fiction.

Lady Willoughby's Diary	32
Macdonald's Villa Verocchio	18
Sir Roger De Coverley	26
Southey's The Doctor etc.	27

AN ALPHABETICAL CATALOGUE

OF

NEW WORKS AND NEW EDITIONS

PUBLISHED BY

MESSRS. LONGMAN, BROWN, GREEN, AND LONGMANS.

MISS ACTON'S MODERN COOKERY-BOOK.

Modern Cookery in all its Branches, reduced to a System of Easy Practice. For the use of Private Families. In a Series of Practical Receipts, all of which have been strictly tested, and are given with the most minute exactness. By Eliza Acton. New Edition; with Directions for Carving, and other Additions. Foolscap 8vo. with Plates and Woodcuts, 7*s.* 6*d.* cloth.

ADAMS.—A SPRING IN THE CANTERBURY SETTLEMENT.

By C. Warren Adams, Esq. With Five Illustrations. Post 8vo. price 5*s.* 6*d.* cloth.

ADDISON.—THE HISTORY OF THE KNIGHTS TEMPLARS,

By C. G. Addison, of the Inner Temple, Esq., Barrister-at-Law. Third Edition, corrected and improved: with Four Lithographic and Three Woodcut Illustrations. Square crown 8vo. 10*s.* 6*d.* cloth.

AIKIN.—SELECT WORKS OF THE BRITISH POETS:

From Ben Jonson to Coleridge. With Biographical and Critical Prefaces by Dr. Aikin. A New Edition; with additional Selections, from more recent Poets, by Lucy Aikin. Medium 8vo. 18*s.* cloth.

ANCELL.—A TREATISE ON TUBERCULOSIS,

The Constitutional Origin of Consumption and Scrofula. By Henry Ancell, late Surgeon to the Western General Dispensary, and Lecturer on Materia Medica and Jurisprudence in the School of Anatomy and Medicine adjoining St. George's Hospital. 8vo. price One Guinea, cloth.

ANTHONY.—FOOTSTEPS TO HISTORY:

Being an Epitome of the Histories of England and France; to which are added, slight Sketches of Literature, Arts and Manufactures. By Louisa Anthony. The Second Edition, thoroughly revised, with considerable Additions. Foolscap 8vo. price 5*s.* 6*d.* cloth.

THE ARTISAN CLUB.—A TREATISE ON THE STEAM-ENGINE,

in its Application to Mines, Mills, Steam Navigation, and Railways. By the Artisan Club. Edited by John Bourne, C.E. New Edition. With 30 Steel Plates, and about 350 Wood Engravings. 4to. 27*s.* cloth.

JOANNA BAILLIE'S DRAMATIC AND POETICAL WORKS,

Complete in One Volume: Comprising the Plays on the Passions, Miscellaneous Dramas, Metrical Legends, Fugitive Pieces, and Ahalya Baee. Second Edition; including a Life of Joanna Baillie, now first published: with a Portrait engraved by H. Robinson, and a Vignette View of Bothwell Manse. Square crown 8vo. 21*s.* cloth, or 42*s.* bound in morocco by Hayday.

BAINES.—THE LIFE OF EDWARD BAINES,
late M.P. for the Borough of Leeds. By his Son, Edward Baines, Author of *The History of the Cotton Manufacture*. With a Portrait, engraved in line by Greatbach. 8vo. 9*s*.

BALFOUR.—SKETCHES OF ENGLISH LITERATURE,
from the Fourteenth to the Present Century. By Clara Lucas Balfour, Author of *Women of Scripture*, etc. Foolscap 8vo. 7*s*. cloth.

BANFIELD.—THE STATISTICAL COMPANION:
Exhibiting the most interesting Facts in Moral and Intellectual, Vital, Economical, and Political Statistics, at Home and Abroad. Corrected to the Present Time: and including the Results of the Census of the British Population taken in 1851. Compiled from Official and other Authentic Sources, by T. C. Banfield, Esq., Statistical Clerk to the Council of Education. Foolscap 8vo. price 5*s*. cloth.

BAYLDON'S ART OF VALUING RENTS AND TILLAGES,
and Tenant's Right of Entering and Quitting Farms, explained by several Specimens of Valuations; with Remarks on the Cultivation pursued on Soils in different Situations. Adapted to the Use of Landlords, Land Agents, Appraisers, Farmers, and Tenants. New Edition, corrected and revised by John Donaldson. 8vo. 10*s*. 6*d*. cloth.

LORD BELFAST.—LECTURER ON THE ENGLISH POETS
AND POETRY OF THE NINETEENTH CENTURY. By the Right Hon. the Earl of Belfast. Foolscap 8vo. price 6*s*. 6*d*. cloth.

BLACK'S PRACTICAL TREATISE ON BREWING,
Based on Chemical and Economical Principles: With Formulæ for Public Brewers, and Instructions for Private Families. New and greatly improved Edition, with considerable Additions. 8vo. 10*s*. 6*d*. cloth.

BLAINE'S ENCYCLOPÆDIA OF RURAL SPORTS;
Or, a complete Account, Historical, Practical, and Descriptive, of Hunting, Shooting, Fishing, Racing, and other Field Sports and Athletic Amusements of the present day. A New and thoroughly revised Edition; with copious Additions and Improvements, and numerous additional Illustrations. The Hunting, Racing, and all relative to Horses and Horsemanship, revised by *Harry Hieover*; Shooting and Fishing by *Ephemera*; and Coursing by Mr. A. Graham. With upwards of 600 Woodcuts. 8vo. 50*s*. half-bound.

BLAIR'S CHRONOLOGICAL AND HISTORICAL TABLES,
From the Creation to the present Time: with Additions and Corrections from the most authentic Writers; including the Computation of St. Paul, as connecting the Period from the Exode to the Temple. Under the revision of Sir Henry Ellis, K.H., Principal Librarian of the British Museum. New Edition, corrected. Imperial 8vo. 31*s*. 6*d*. half morocco.

BLOOMFIELD.—THE GREEK TESTAMENT:
With copious English Notes, Critical, Philological, and Explanatory. Formed for the use of advanced Students of Divinity and Candidates for Holy Orders. By the Rev. S. T. Bloomfield, D.D. F.S.A. New Edition. 2 vols. 8vo. with a Map of Palestine, 40*s*. cloth.

THE REV. DR. BLOOMFIELD'S ADDITIONAL ANNOTATIONS ON THE NEW TESTAMENT: being a Supplement to his larger Edition of the Greek Testament with English Notes. New Edition. 8vo. 15*s*. cloth.

BLOOMFIELD.—THE GREEK TESTAMENT FOR COLLEGES
AND SCHOOLS; with shorter English Notes, Critical, Philological, and Explanatory. By the Rev. S. T. Bloomfield, D.D., F.S.A. New Edition, enlarged, with a New Map and an Index. Foolscap 8vo. 10*s*. 6*d*. cloth.

BOURNE.—A TREATISE ON THE SCREW PROPELLER:
With various Suggestions of Improvement. By John Bourne, C.E. Editor of *The Artisan Club's Treatise on the Steam Engine*. With 20 large Plates and numerous Woodcuts 4to. price 3*s*. cloth.

BOURNE.—A CATECHISM OF THE STEAM-ENGINE,

Illustrative of the Scientific Principles upon which its Operation depends, and the Practical Details of its Structure, in its Applications to Mines, Mills, Steam Navigation, and Railways; with various Suggestions of Improvement. By John Bourne, C.E. Third Edition. Foolscap 8vo. 6s. cloth.

BRANDE.—A DICTIONARY OF SCIENCE, LITERATURE, AND ART: Comprising the History, Description and Scientific Principles of every Branch of Human Knowledge; with the Derivation and Definition of all the Terms in general use. Edited by W. T. Brande, F.R.S.L. and E.; assisted by Dr. J. Cauvin. Second Edition, revised and corrected; including a Supplement, and numerous Wood Engravings. 8vo. price 60s. cloth.

The SUPPLEMENT separately, price 3s. 6d.

BULL.—HINTS TO MOTHERS.

For the Management of their Health during the Period of Pregnancy and in the Lying-in Room: with an Exposure of Popular Errors in connexion with those subjects, etc.; and Hints upon Nursing. By Thomas Bull, M.D. New Edition. Foolscap 8vo. 5s. cloth.

BULL.—THE MATERNAL MANAGEMENT OF CHILDREN.

IN HEALTH and DISEASE. By Thomas Bull, M.D. late Physician Accoucheur to the Finsbury Midwifery Institution. New Edition, revised and enlarged. Fcap. 8vo. 5s. cloth.

BUNSEN.—HIPPOLYTUS AND HIS AGE;

Or, Doctrine and Practice of the Church of Rome under Commodus and Alexander Severus. And Ancient and Modern Christianity and Divinity compared. By C. C. J. Bunsen, D.C.L. With the Effigy of Hippolytus. 4 vols. post 8vo. 42s. cloth.

BUNSEN.—EGYPT'S PLACE IN UNIVERSAL HISTORY.

An Historical Investigation, in Five Books. By C. C. J. Bunsen, D.C.L. Translated from the German, by C. H. Cottrell, Esq. M.A. Vol. I. containing the First Book, or Sources and Primeval Facts of Egyptian History; with an Egyptian Grammar and Dictionary and a complete List of Hieroglyphical Signs; an Appendix of Authorities, embracing the complete Text of Manetho and Eratosthenes, Ægyptiaca from Pliny, Strabo, etc., and Plates representing the Egyptian Divinities. With many Illustrations. 8vo. 28s. cloth.

*** The SECOND VOLUME, comprising the Second and Third Volumes of the original German Edition, revised and corrected by the Author, is preparing for publication.

BURTON.—THE HISTORY OF SCOTLAND,

From the Revolution to the Extinction of the last Jacobite Insurrection (1689—1748.) By John Hill Burton, Author of *The Life of David Hume*, etc. 2 vols. 8vo. [*In the press.*

BISHOP BUTLER'S SKETCH OF MODERN AND ANCIENT GEOGRAPHY. New Edition, carefully revised throughout, with such Alterations introduced as continually progressive Discoveries and the latest Information have rendered necessary. Edited by the Author's Son, the Rev. T. Butler. 8vo. 9s. cloth.

BISHOP BUTLER'S GENERAL ATLAS OF MODERN AND ANCIENT GEOGRAPHY. Comprising Fifty-one full-coloured Maps; with complete Indexes. New Edition, nearly all re-engraved, enlarged, and greatly improved; with Corrections from the most authentic Sources in both the Ancient and Modern Maps, many of which are entirely new. Edited by the Author's Son, the Rev. T. Butler. Royal 4to. 24s. half-bound.

Separately { The Modern Atlas, 28 full-coloured Maps. Royal 8vo. 12s. half-bound.
The Ancient Atlas, 23 full-coloured Maps. Royal 8vo. 12s. half-bound.

THE CABINET GAZETTEER:

A Popular Exposition of all the Countries of the World; their Government, Population, Revenues, Commerce and Industries; Agricultural, Manufactured, and Mineral Products; Religion, Laws, Manners, and Social State: with brief Notices of their History and Antiquities. From the latest Authorities. By the Author of *The Cabinet Lawyer*. In One Volume, with a coloured Map. Fcap. 8vo. price 10s. 6d. cloth; or 13s. calf lettered.

THE CABINET LAWYER:

A Popular Digest of the Laws of England, Civil and Criminal; with a Dictionary of Law Terms, Maxims, Statutes, and Judicial Antiquities; Correct Tables of Assessed Taxes, Stamp Duties, Excise Licences, and Post-Horse Duties; Post-Office Regulations, and Prison Discipline. Fifteenth Edition, with Supplements. Fcap. 8vo. 10*s.* 6*d.* cloth.

CAIRD.—ENGLISH AGRICULTURE IN 1850 AND 1851:

Its Condition and Prospects. By James Caird, Esq., of Baldoon, Agricultural Commissioner of *The Times*. Second Edition. 8vo. 14*s.* cloth.

THE CALLING AND RESPONSIBILITIES OF A GOVERNESS.

By Amica. Fcap. 8vo. price 4*s.* 6*d.* cloth.

CATLOW.—POPULAR CONCHOLOGY;

Or, the Shell Cabinet arranged: being an Introduction to the modern System of Conchology; with a Sketch of the Natural History of the Animals, an Account of the Formation of the Shells, and a complete Descriptive List of the Families and Genera. By Agnes Catlow. With 312 Woodcuts. Foolscap 8vo. 10*s.* 6*d.* cloth.

CAYLEY.—DANTE'S DIVINE COMEDY.

Translated in the Original Ternary Rhyme. By C. B. Cayley, B.A. Vol. I. THE VISION OF HELL. Fcap. 8vo. 6*s.* cloth.—Vol. II. THE PURGATORY. Fcap. 8vo. price 6*s.* cloth.

CECIL.—STABLE PRACTICE.

Or, Hints on Training for the Turf, the Chase, and the Road, with Observations on Racing and Hunting, Wasting, Race Riding, and Handicapping. Addressed to Owners of Racers, Hunters, and other Horses, and to all who are concerned in Racing, Steeple-Chasing, and Fox Hunting. By Cecil. Fcap. 8vo. with Plate, price 5*s.* half-bound.

CECIL.— THE STUD FARM; OR, HINTS ON BREEDING

HORSES FOR THE TURF, THE CHASE, AND THE ROAD. Addressed to Breeders of Race Horses and Hunters, Landed Proprietors, and especially to Tenant Farmers. By Cecil. Fcap. 8vo. with Plate, 5*s.* half-bound.

CONVERSATIONS ON BOTANY.

New Edition, improved. Foolscap 8vo. with 22 Plates, 7*s.* 6*d.* cloth; with coloured Plates, 12*s.*

CONYBEARE AND HOWSON.—THE LIFE AND EPISTLES

OF ST. PAUL; Comprising a complete Biography of the Apostle, and a Translation of his Epistles inserted in Chronological order. Edited by the Rev. W. J. Conybeare, M.A. late Fellow of Trinity College, Cambridge; and the Rev. J. S. Howson, M.A. Principal of the Collegiate Institution, Liverpool. With 40 Engravings on Steel and 100 Woodcuts, including Views of the Principal Places visited by the Apostle, from Original Drawings made on the spot by W. H. Bartlett, and other Travellers; also Maps, Charts, Plans, Coins, Antiquities, etc. 2 vols. 4to. price 2*l.* 8*s.* cloth.

COPLAND.—A DICTIONARY OF PRACTICAL MEDICINE.

Comprising General Pathology, the Nature and Treatment of Diseases, Morbid Structures, and the Disorders especially incidental to Climates, to Sex, and to the different Epochs of Life, with numerous approved Formulæ of the Medicines recommended. By James Copland, M.D., etc. etc. Vols. I. and II. 8vo. 3*l.* cloth; and Parts X. to XVI. 4*s.* 6*d.* each.

CORNER.—THE CHILDREN'S OWN SUNDAY-BOOK.

By Miss Julia Corner, Author of "Questions on the History of Europe," etc. With Two Illustrations engraved on Steel. Square fcap. 8vo. 5*s.* cloth.

CRESY.—AN ENCYCLOPÆDIA OF CIVIL ENGINEERING,

HISTORICAL, THEORETICAL, and PRACTICAL. By Edward Cresy, F.S.A. C.E. With upwards of 3000 Engravings on Wood, explanatory of the Principles, Machinery, and Constructions which come under the Direction of the Civil Engineer. 8vo. 3*l.* 13*s.* 6*d.* cloth.

THE CRICKET-FIELD;

Or, the Science and History of the Game. Illustrated with Diagrams, and enlivened with Anecdotes. By the Author of *Principles of Scientific Batting*. Fcap. 8vo. with Plate, 5*s*. half-bound.

DALE.—THE DOMESTIC LITURGY AND FAMILY CHAPLAIN: in Two Parts: the First Part being Church Services adapted for Domestic Use, with Prayers for every Day of the Week, selected exclusively from the Book of Common Prayer. Part II. comprising an appropriate Sermon for every Sunday in the Year. By the Rev. Thomas Dale, M.A., Canon-Residentiary of St. Paul's Cathedral. 2d Edition. Post 4to. 21*s*. cloth; or, bound by Hayday, 31*s*. 6*d*. calf lettered; 50*s*. morocco.

Separately { THE FAMILY CHAPLAIN, price 12*s*. cloth.
THE DOMESTIC LITURGY, price 10*s*. 6*d*. cloth.

DAVIS.—CHINA DURING THE WAR AND SINCE THE PEACE. By Sir J. F. Davis, F.R.S. Bart., late H. M. Plenipotentiary in China; Governor and Commander-in-Chief of the Colony of Hongkong. 2 vols. post 8vo. with Woodcuts, price 21*s*. cloth.

DELABECHE.—THE GEOLOGICAL OBSERVER.

By Sir Henry T. Delabeche, F.R.S. Director-General of the Geological Survey of the United Kingdom. New Edition; with numerous Woodcuts. 8vo. 18*s*. cloth.

DELABECHE.—REPORT ON THE GEOLOGY OF CORNWALL, DEVON AND WEST SOMERSET. By Sir Henry T. De la Beche, F.R.S., Director-General of the Geological Survey of the United Kingdom. With Maps, Woodcuts, and 12 large Plates, 8vo. 14*s*. cloth.

DE LA RIVE.—A TREATISE ON ELECTRICITY, IN THEORY AND PRACTICE. By Auguste De la Rive, Professor in the Academy of Geneva. In Two Volumes, with numerous Wood Engravings. Vol. I. 8vo. price 18*s*. cloth.

DENNISTOUN.—MEMOIRS OF THE DUKES OF URBINO;

Illustrating the Arms, Arts, and Literature of Italy, from MCCCCXL. to MDCXXX. By James Dennistoun, of Dennistoun. With numerous Portraits, Plates, Fac-similes, and Engravings on Wood. 3 vols. square crown 8vo. 2*l*. 8*s*. cloth.

DISCIPLINE.

By the Author of *Letters to my Unknown Friends*, etc. Second Edition, enlarged. 18mo. price Half-a-Crown, cloth.

DOUBLEDAY, WESTWOOD, AND HEWITSON.—THE GENERA OF BUTTERFLIES, OR DIURNAL LEPIDOPTERA: Comprising their Generic Characters, a Notice of the Habits and Transformations, and a Catalogue of the Species, of each Genus. By Edward Doubleday, F.L.S., F.Z.S. late Assistant in the Zoological Department of the British Museum; and John O. Westwood, President of the Entomological Society of London. Illustrated with Eighty-six coloured Plates from Drawings by W. C. Hewitson, Author of *British Oology*. 2 vols. imperial 4to. price 15*l*. 15*s*. half-bound in morocco.

EASTLAKE.—MATERIALS FOR A HISTORY OF OIL PAINTING. By Sir C. L. Eastlake, President of the Royal Academy. 8vo. 16*s*. cloth.

THE ECLIPSE OF FAITH; OR, A VISIT TO A RELIGIOUS SCEPTIC. New Edition. Post 8vo. price 9*s*. 6*d*. cloth.

"*It is absolutely necessary to meet them*" [*infidel writers of the modern school*] "*on their own ground, and fight them with their own weapons. And this is what the little book at the head of this article professes to do; and it does its work well. It is learned and logical, and at the same time lively and entertaining. Its irony is very powerful and cutting, and yet it is not open to the apparent objection of grave and serious subjects being treated flippantly. Whilst from the nature of the subject, it might fairly be entitled* Theological Fragments, *from the method in which the subject is treated it is as interesting as a collection of scenes of society.*" Britannia.

THE ENGLISHMAN'S GREEK CONCORDANCE OF THE NEW TESTAMENT; being an attempt at a Verbal Connexion between the Greek and the English Texts; including a Concordance to the Proper Names, with Indexes, Greek-English and English-Greek. Second Edition, carefully revised; with a new Index, Greek and English. Royal 8vo. 42*s.* cloth.

THE ENGLISHMAN'S HEBREW AND CHALDEE CONCORDANCE OF THE OLD TESTAMENT; being an attempt at a Verbal Connexion between the Original and the English Translations: with Indexes, a List of the Proper Names and their Occurrences, etc. etc. 2 vols. royal 8vo. 3*l.* 13*s.* 6*d.* cloth; large paper, 4*l.* 14*s.* 6*d.*

EPHEMERA.—THE BOOK OF THE SALMON.
Comprising the Theory, Principles, and Practice of Fly-Fishing for Salmon; with Lists of good Salmon Flies for every good River in the Empire; with the Natural History of the Salmon, all its known Habits described, and the best way of artificially Breeding it explained. With numerous coloured Engravings of Salmon Flies and Salmon Fry. By Ephemera, assisted by Andrew Young, of Invershin, Manager of the Duke of Sutherland's Salmon Fisheries. Foolscap 8vo. with coloured Plates, 14*s.* cloth.

EPHEMERA.—A HAND-BOOK OF ANGLING:
Teaching Fly Fishing, Trolling, Bottom Fishing, and Salmon Fishing. With the Natural History of River Fish, and the best Modes of Catching them. By Ephemera. New Edition, enlarged and improved. Foolscap 8vo. with Wood Engravings, 9*s.* cloth.

THE EXPERIENCE OF LIFE.
By the Author of *Amy Herbert*, *Gertrude*, etc. Fcap. 8vo. price 7*s.* 6*d.* cloth.

FELICE'S HISTORY OF THE PROTESTANTS OF FRANCE
From 1521 to 1851. Translated from the Second, revised, and corrected Edition, by E. West. 2 vols. post 8vo. [*In the press.*

FORBES.—DAHOMEY AND THE DAHOMANS:
Being the Journals of Two Missions to the King of Dahomey, and Residence at his Capital, in the Years 1849 and 1850. By Frederick E. Forbes, Commander, R.N., F.R.G.S. With 10 Plates and Wood Engravings. 2 vols. post 8vo. 21*s.* cloth.

FORESTER AND BIDDULPH.—NORWAY IN 1848 & 1849:
Containing Rambles among the Fjelds and Fjords of the Central and Western Districts; and including Remarks on its Political, Military, Ecclesiastical, and Social Organisation By Thomas Forester, Esq.; and Lieutenant M. S. Biddulph, Royal Artillery. With Wood Engravings, and 10 coloured Plates. 8vo. 18*s.* cloth.

FOSS.—THE JUDGES OF ENGLAND:
With Sketches of their Lives, and Miscellaneous Notices connected with the Courts at Westminster from the time of the Conquest. By Edward Foss, F.S.A., of the Inner Temple. Vols. I. II. III. and IV. 8vo. 56*s.* cloth.

FRANCIS.—THE HISTORY OF THE BANK OF ENGLAND;
Its Times and Traditions. By John Francis. Third Edition. 2 vols. 8vo. 21*s.* cloth.

FRANCIS.—A HISTORY OF THE ENGLISH RAILWAY;
Its Social Relations and Revelations. By John Francis. 2 vols. 8vo. 24*s.* cloth.

FRANCIS.—CHRONICLES AND CHARACTERS OF THE STOCK EXCHANGE. By John Francis. Second Edition. 8vo. 12*s.* cloth.

FREEMAN.—THE LIFE OF THE REV. WILLIAM KIRBY,
M.A., F.R.S., F.L.S., etc., Rector of Barham; Author of one of the Bridgewater Treatises, and Joint-Author of the *Introduction to Entomology*. By the Rev. John Freeman, M.A., Rector of Ashwicken, Norfolk, and Rural Dean. With a Portrait of Mr. Kirby (engraved by Henry Robinson), a Fac-simile of his Handwriting, and a View of Barham Parsonage. 8vo. price 15*s.* cloth.

THE POETICAL WORKS OF OLIVER GOLDSMITH.

Illustrated by Wood Engravings, from Designs by Members of the Etching Club. Edited by Bolton Corney, Esq. Square crown 8vo. 21*s.* cloth; or 36*s.* bound in morocco, by Hayday.

GOSSE.—A NATURALIST'S SOJOURN IN JAMAICA.

By P. H. Gosse, Esq. With coloured Plates. Post 8vo. 14*s.* cloth.

GRAHAM.—STUDIES FROM THE ENGLISH POETS:

Comprising Selections from Milton, Shakspeare, Pope, Gray, Goldsmith, Cowper, and Collins; with the strikingly beautiful Passages printed in italics; Explanatory Notes and Illustrations; and Examination Questions for exercise in English Composition. By G. F. Graham. 12mo. price 7*s.* cloth.

GRAHAM.—ENGLISH; OR, THE ART OF COMPOSITION.

Explained in a Series of Instructions and Examples. By G. F. Graham. New Edition, revised and improved. Foolscap 8vo. 6*s.* cloth.

MR. W. R. GREG'S CONTRIBUTIONS TO THE EDINBURGH REVIEW.—ESSAYS ON POLITICAL AND SOCIAL SCIENCE,

contributed chiefly to the *Edinburgh Review*. By William R. Greg. 2 vols. 8vo. price 24*s.* cloth.

GURNEY.—HISTORICAL SKETCHES;

Illustrating some Memorable Events and Epochs, from A.D. 1400 to A.D. 1546. By the Rev. John Hampden Gurney, M.A., Rector of St. Mary's, Mary-le-bone. Fcap. 8vo. 7*s.* 6*d.* cloth.

GWILT.—AN ENCYCLOPÆDIA OF ARCHITECTURE:

Historical, Theoretical, and Practical. By Joseph Gwilt. Illustrated with more than One Thousand Engravings on Wood, from Designs by J. S. Gwilt. Second Edition, with Supplemental View of the Symmetry and Stability of Gothic Architecture: Comprising upwards of 80 additional Woodcuts. 8vo. 52*s.* 6*d.* cloth.—The SUPPLEMENT separately, 6*s.*

SIDNEY HALL'S GENERAL LARGE LIBRARY ATLAS OF

FIFTY-THREE MAPS (size 20 in. by 76 in.), with the Divisions and Boundaries carefully coloured; and an Alphabetical Index of all the Names contained in the Maps. New Edition, corrected from the best and most recent Authorities; with the Railways laid down, and many entirely new Maps. Colombier 4to. 5*l.* 5*s.* half-bound in russia.

HAMILTON.—DISCUSSIONS IN PHILOSOPHY AND

LITERATURE, EDUCATION AND UNIVERSITY REFORM. Chiefly from the *Edinburgh Review*; corrected, vindicated, enlarged, in Notes and Appendices. By Sir William Hamilton, Bart. 8vo. 18*s.* cloth.

HARRISON.—THE LIGHT OF THE FORGE;

Or, Counsels drawn from the Sick-Bed of E. M. By the Rev. William Harrison, M.A., Rector of Birch, Essex, and Domestic Chaplain to H.R.H. the Duchess of Cambridge. With 2 Wood Engravings. Foolscap 8vo. price 5*s.* cloth.

HARRISON.—ON THE RISE, PROGRESS, AND PRESENT

STRUCTURE OF THE ENGLISH LANGUAGE. By the Rev. M. Harrison, M.A., late Fellow of Queen's College, Oxford. Post 8vo. 8*s.* 6*d.* cloth.

HARRY HIEOVER.—THE HUNTING-FIELD.

By Harry Hieover. With Two Plates, one representing *The Right Sort*; the other, *The Wrong Sort*. Fcap. 8vo. 5*s.* half-bound.

HARRY HIEOVER.—PRACTICAL HORSEMANSHIP.

By Harry Hieover. With 2 Plates, one representing *Going like Workmen*; the other, *Going like Muffs*. Foolscap 8vo. 5*s.* half-bound.

HARRY HIEOVER.—THE STUD, FOR PRACTICAL PURPOSES AND PRACTICAL MEN: being a Guide to the Choice of a Horse for use more than for show. By Harry Hieover. With 2 Plates, one representing *A pretty good sort for most purposes*; the other, *Rayther a bad sort for any purpose*. Fcap. 8vo. 5*s*. half-bound.

HARRY HIEOVER.—THE POCKET AND THE STUD; Or, Practical Hints on the Management of the Stable. By Harry Hieover. With a Portrait of the Author on his favourite Horse *Harlequin*. Second Edition. Foolscap 8vo. 5*s*. half-bound.

HARRY HIEOVER.—STABLE TALK AND TABLE TALK; Or, SPECTACLES for YOUNG SPORTSMEN. By Harry Hieover. New Edition. 2 vols. 8vo. with Portrait, 24*s*. cloth.

HAWKER.—INSTRUCTIONS TO YOUNG SPORTSMEN In all that relates to Guns and Shooting. By Lieut.-Col. P. Hawker. 9th edition, corrected, enlarged, and improved; with Eighty-five Plates and Woodcuts, by Adlard and Branston, from Drawings by C. Varley, Dickes, etc. 8vo. 21*s*. cloth.

HAYDN'S BOOK OF DIGNITIES: Containing Rolls of the Official Personages of the British Empire, Civil, Ecclesiastical, Judicial, Military, Naval, and Municipal, from the Earliest Periods to the Present Time: compiled chiefly from the Records of the Public Offices. Together with the Sovereigns of Europe, from the Foundation of their respective States; the Peerage of England and of Great Britain; and numerous other Lists. Being a New Edition, improved and continued, of BEATSON'S POLITICAL INDEX. By Joseph Haydn, Compiler of *The Dictionary of Dates*, and other Works. 8vo. 25*s*. half-bound.

SIR JOHN HERSCHEL.—OUTLINES OF ASTRONOMY. By Sir John F. W. Herschel, Bart. etc. New Edition; with Plates and Engravings on Wood. 8vo. 18*s*. cloth.

HINTS ON ETIQUETTE AND THE USAGES OF SOCIETY: With a Glance at Bad Habits. By Αγωγός. "Manners make the Man." New Edition, revised (with Additions) by a Lady of Rank. Foolscap 8vo. 2*s*. 6*d*. cloth.

HOLLAND.—MEMOIRS OF THE WHIG PARTY DURING MY TIME. By Henry Richard Lord Holland. Edited by his Son, Henry Edward Lord Holland. Vol. I. post 8vo. 9*s*. 6*d*. cloth.

LORD HOLLAND'S FOREIGN REMINISCENCES.—FOREIGN REMINISCENCES. By Henry Richard Lord Holland. Comprising Anecdotes, and an Account of such Persons and Political Intrigues in Foreign Countries as have fallen within his Lordship's Observation. Edited by his Son, Henry Edward Lord Holland. With Fac-simile. Second Edition. Post 8vo. 10*s*. 6*d*. cloth.

HOLLAND.—CHAPTERS ON MENTAL PHYSIOLOGY. By Henry Holland, M.D., F.R.S.; Physician Extraordinary to the Queen; and Physician in Ordinary to His Royal Highness Prince Albert. Founded chiefly on Chapters contained in *Medical Notes and Reflections*, by the same Author. 8vo. price 10*s*. 6*d*. cloth.

HOOK.—THE LAST DAYS OF OUR LORD'S MINISTRY; A Course of Lectures on the principal Events of Passion Week. By Walter Farquhar Hook, D.D., Chaplain in Ordinary to the Queen. New Edition. Foolscap 8vo. 6*s*. cloth.

HOOKER.—KEW GARDENS: Or a Popular Guide to the Royal Botanic Gardens of Kew. By Sir William Jackson Hooker, K.H. D.C.L. F.R.A. & L.S. etc. etc. Director. New Edition; with numerous Wood-Engravings. 16mo. price Sixpence.

HOOKER AND ARNOTT.—THE BRITISH FLORA;
Comprising the Phænogamous or Flowering Plants, and the Ferns. The Sixth Edition with Additions and Corrections, and numerous Figures, illustrative of the Umbelliferous Plants, the Composite Plants, the Grasses, and the Ferns. By Sir W. J. Hooker, F.R.A. and L.S. etc., and G. A. Walker Arnott, LL.D. 12mo. with 12 Plates, 14*s.* cloth; or with the Plates coloured, price 21*s.*

HORNE.—AN INTRODUCTION TO THE CRITICAL STUDY AND KNOWLEDGE OF THE HOLY SCRIPTURES. By the Rev. Thomas Hartwell Horne, B.D. of St. John's College, Cambridge. New Edition, revised and corrected; with Maps and Fac-similes. 5 vols. 8vo. 3*l.* 3*s.* cloth; or 5*l.* bound in calf.

HORNE.—A COMPENDIOUS INTRODUCTION TO THE STUDY OF THE BIBLE. By the Rev. Thomas Hartwell Horne, B.D. of St. John's College, Cambridge. Being an Analysis of his *Introduction to the Critical Study and Knowledge of the Holy Scriptures.* New Edition. 12mo. with Maps and Engravings on Wood, 9*s.* cloth.

HOWITT.—THE CHILDREN'S YEAR.
By Mary Howitt. With Four Illustrations, engraved by John Absolon, from Original Designs by Anna Mary Howitt. Square 16mo. 5*s.* cloth.

WILLIAM HOWITT'S BOY'S COUNTRY BOOK;
Being the real Life of a Country Boy, written by Himself: Exhibiting all the Amusements, Pleasures, and Pursuits of Children in the Country. New Edition. Fcap. 8vo. with 40 Woodcuts, 6*s.* cloth.

HOWITT.—VISITS TO REMARKABLE PLACES;
Old Halls, Battle-Fields, and Scenes illustrative of Striking Passages in English History and Poetry. By William Howitt. New Edition; with 40 Woodcuts. Medium 8vo. 21*s.* cloth.

SECOND SERIES, chiefly in the Counties of DURHAM and NORTHUMBERLAND, with a Stroll along the BORDER. With upwards of 40 highly-finished Woodcuts, from Drawings made on the spot. Medium 8vo. 21*s.* cloth.

HOWITT.—THE RURAL LIFE OF ENGLAND.
By William Howitt. New Edition, corrected and revised. With Engravings on Wood by Bewick and Williams; uniform with *Visits to Remarkable Places.* Medium 8vo. 21*s.* cloth.

HUDSON.—THE EXECUTOR'S GUIDE.
By J. C. Hudson, Esq., late of the Legacy Duty Office, London; Author of *Plain Directions for Making Wills.* New Edition. Foolscap 8vo. 3*s.* cloth.

HUDSON.—PLAIN DIRECTIONS FOR MAKING WILLS
In conformity with the Law: with a clear Exposition of the Law relating to the Distribution of Personal Estate in the case of Intestacy, two Forms of Wills, and much useful Information etc. By J. C. Hudson, Esq. New Edition, corrected. Fcap. 8vo. 2*s.* 6*d.* cloth.

*** *The above Two Works may be had in One Volume, price* 7*s. cloth.*

HUGHES (E.)—A NEW SCHOOL ATLAS OF PHYSICAL, POLITICAL, AND COMMERCIAL GEOGRAPHY. By Edward Hughes, F.R.G.S., Head Master of the Royal Naval Lower School, Greenwich Hospital. Containing Seventeen coloured Maps, with a descriptive Letterpress. The Maps engraved on Steel by E. Weller, F.R.G.S. Royal 8vo. price 10*s.* 6*d.* half-bound.

HUGHES (W.)—A MANUAL OF MATHEMATICAL GEOGRAPHY: comprehending an Inquiry into the Construction of Maps; with Rules for the Formation of Map Projections. By William Hughes, F.R.G.S. late Professor of Geography in the College for Civil Engineers. Second Edition; with 5 Plates. Fcap. 8vo. price 4*s.* 6*d.* cloth.

HUMBOLDT'S ASPECTS OF NATURE,

In Different Lands and Different Climates, with Scientific Elucidations. Translated, with the Author's sanction and co-operation, and at his express desire, by Mrs. Sabine. 16mo. 6*s.* cloth: or in 2 vols. 3*s.* 6*d.* each cloth; 2*s.* 6*d.* each sewed.

HUMBOLDT'S COSMOS;

Or, a Sketch of a Physical Description of the Universe.' Translated, with the Author's sanction and co-operation, by Mrs. Sabine. New Edition. Vols. I. and II. 16mo. 3*s.* 6*d.* each cloth; 2*s.* 6*d.* each sewed: or in post 8vo. price 12*s.* each. Vol. III. post 8vo. 12*s.* 6*d.* cloth: or in 16mo. Part I. 2*s.* 6*d.* sewed, 3*s.* 6*d.* cloth; and Part II. 3*s.* sewed, 4*s.* cloth.

HUMPHREYS.—SENTIMENTS AND SIMILES OF SHAKSPEARE:

with an elaborately illuminated Border in the characteristic Style of the Elizabethan Period, and other Embellishments; bound in very massive carved and pierced covers, containing in deep relief a medallion Head and Cypher. The Illuminations and Ornaments designed and executed by Henry Noel Humphreys. Square post 8vo. price One Guinea.

MRS. JAMESON'S LEGENDS OF THE MONASTIC ORDERS

As represented in the Fine Arts. Containing St. Benedict and the early Benedictines in Italy, France, Spain, and Flanders; the Benedictines in England and in Germany; the Reformed Benedictines; early Royal Saints connected with the Benedictine Order; the Augustines; Orders derived from the Augustine Rule; the Mendicant Orders; the Jesuits; and the Order of the Visitation of St. Mary. Forming the SECOND SERIES of *Sacred and Legendary Art.* Second Edition, corrected and enlarged; with 11 Etchings by the Author and 83 Woodcuts. Square crown 8vo. 28*s.* cloth.

MRS. JAMESON'S SACRED AND LEGENDARY ART;

Or, Legends of the Saints and Martyrs. FIRST SERIES. Containing, Legends of the Angels and Archangels; the Evangelists and Apostles; the Greek and Latin Fathers; the Magdalene; the Patron Saints; the Virgin Patronesses; the Martyrs; the Bishops; the Hermits; and the Warrior-Saints of Christendom. Second Edition, with numerous Woodcuts, and 16 Etchings by the Author. Square crown 8vo. 28*s.* cloth.

MRS. JAMESON'S LEGENDS OF THE MADONNA,

As represented in the Fine Arts. Forming the THIRD *and concluding* SERIES of *Sacred and Legendary Art.* With 55 Drawings by the Author: 152 Wood Engravings. Square 8vo. price 28*s.* cloth.

LORD JEFFREY'S CONTRIBUTIONS TO THE EDINBURGH

REVIEW. A New Edition, complete in One Volume, uniform with Mr. Macaulay's Essays, and Sir James Mackintosh's and the Rev. Sydney Smith's Works; with a Portrait engraved by Henry Robinson, and a Vignette View of Craigcrook, engraved by J. Cousen. Square crown 8vo. [*Nearly ready.*

*** *Also, the Second Edition, in* 3 *vols. 8vo. price* 42*s. cloth.*

BISHOP JEREMY TAYLOR'S ENTIRE WORKS:

With the Life by Bishop Heber. Revised and corrected by the Rev. Charles Page Eden, Fellow of Oriel College, Oxford. In Ten Volumes. Vols. II. to X. 8vo. price Half-a-Guinea each.

*** The First *Volume comprising Bishop Heber's Life of Jeremy Taylor, extended by the Editor, is nearly ready for publication.*

READINGS FOR EVERY DAY IN LENT.

Compiled from the Writings of Bishop Jeremy Taylor. By the Author of *Amy Herbert, The Child's First History of Rome,* etc. Fcap. 8vo. 5*s.* cloth.

JOHNSTON.—A NEW DICTIONARY OF GEOGRAPHY,

Descriptive, Physical, Statistical, and Historical: Forming a complete General Gazetteer of the World. By Alexander Keith Johnston, F.R.S.E. F.R.G.S. F.G.S.; Geographer at Edinburgh in Ordinary to Her Majesty. In One Volume comprising nearly 50,000 Names of Places. 8vo. 36*s.* cloth; or strongly half-bound in russia, price 41*s.*

KEMBLE.—THE SAXONS IN ENGLAND:
A History of the English Commonwealth till the period of the Norman Conquest. By John Mitchell Kemble, M.A., F.C.P.S., etc. 2 vols. 8vo. 28*s.* cloth.

KIPPIS.—A COLLECTION OF HYMNS AND PSALMS FOR PUBLIC AND PRIVATE WORSHIP, Selected and Prepared by Andrew Kippis, D.D., F.R.S., Abraham Rees, D.D., F.R.S., the Rev. Thomas Jervis, and the Rev. Thomas Morgan, LL.D. New Edition; including a New Supplement by the Rev. Edmund Kell, M.A. 18mo. 4*s.* cloth; or 4*s.* 6*d.* bound in roan. The SUPPLEMENT separately, price 8*d.*

KIRBY AND SPENCE.—AN INTRODUCTION TO ENTOMOLOGY; or, Elements of the Natural History of Insects: comprising an account of noxious and useful Insects, of their Metamorphoses, Food, Stratagems, Habitations, Societies, Motions, Noises, Hybernation, Instinct, etc. By W. Kirby, M.A. F.R.S. & L.S. and W. Spence, Esq., F.R.S. & L.S. New Edition, enlarged. 2 vols. 8vo. 31*s.* 6*d.* cloth.

L. E. L.—THE POETICAL WORKS OF LETITIA ELIZABETH LANDON: Comprising the IMPROVISATRICE, the VENETIAN BRACELET, the GOLDEN VIOLET, the TROUBADOUR, and other Poetical Remains. New Edition, with 2 Vignettes by Richard Doyle. 2 vols. 16mo. 10*s.* cloth; morocco, 21*s.*

LAING.—OBSERVATIONS ON THE SOCIAL AND POLITICAL STATE OF DENMARK AND THE DUCHIES OF SLESWICK AND HOLSTEIN, in 1851: Being the Third Series of *Notes of a Traveller*. By Samuel Laing, Esq. With a Plan of the Battle of Idstedt. 8vo. price 12*s.* cloth.

LAING.—OBSERVATIONS ON THE SOCIAL AND POLITICAL STATE OF THE EUROPEAN PEOPLE IN 1848 AND 1849: Being the Second Series of *Notes of a Traveller*. By Samuel Laing, Esq. 8vo. 14*s.* cloth.

LANG.—FREEDOM AND INDEPENDENCE FOR THE GOLDEN LANDS OF AUSTRALIA; the Right of the Colonies, and the Interest of Britain and of the World. By John Dunmore Lang, M.A., D.D. With a coloured Map. Post 8vo. price 7*s.* 6*d.* cloth.

LANG.—AN HISTORICAL AND STATISTICAL ACCOUNT OF NEW SOUTH WALES; Including a Visit to the Gold Regions, and a Description of the Mines; with an Estimate of the probable Results of the Great Discovery. By John Dunmore Lang, M.A., D.D. Third Edition (three-fourths entirely new), bringing down the History of the Colony to July 1, 1852; with a large coloured Map. 2 vols. post 8vo. price 21*s.* cloth.

LARDNER.—THE GREAT EXHIBITION AND LONDON IN 1851. Reviewed by Dr. Lardner, Michel Chevalier, John Lemoinne, and Hector Berlioz. With Wood Engravings. Crown 8vo. price 14*s.* cloth.

LATHAM.—ON DISEASES OF THE HEART.
Lectures on Subjects connected with Clinical Medicine: Diseases of the Heart. By P. M. Latham, M.D., Physician Extraordinary to the Queen. New Edition. 2 vols. 12mo. 16*s.* cloth.

DR. FALCK LEBAHN.—GOETHE'S FAUST.
With copious English Notes, Grammatical, Philological, and Exegetical, for advanced Students of the German Language. By Falck Lebahn, Ph.D., Professor of the German Language; Author of *Practice in German*, etc. 8vo. price 15*s.* cloth.

LEE.—ELEMENTS OF NATURAL HISTORY; OR, FIRST PRINCIPLES OF ZOOLOGY: Comprising the Principles of Classification, interspersed with amusing and instructive Accounts of the most remarkable Animals. By Mrs. R. Lee. New Edition, enlarged; with many additional Woodcuts. Foolscap 8vo. 7*s.* 6*d.* cloth.

LARDNER'S CABINET CYCLOPÆDIA,

Of History, Biography, Literature, the Arts and Sciences, Natural History, and Manufactures. Comprising a Series of Original Works by Sir John Herschel, Sir James Mackintosh, Robert Southey, Sir David Brewster, Thomas Keightley, John Forster, Sir Walter Scott, Thomas Moore, Bishop Thirlwall, the Rev. G. R. Gleig, J. C. L. Sismondi, John Phillips, F.R.S., G.S., and other eminent Writers. 132 vols. fcap. 8vo. with Vignette Titles, price NINETEEN GUINEAS, cloth.—The works separately, in Sets or Series, price THREE SHILLINGS and SIXPENCE each Volume.

A List of the Works comprising the CABINET CYCLOPÆDIA.

1. Bell's History of Russia . 3 vols. 10*s.* 6*d.*
2. Bell's Lives of British Poets, 2 vols. 7*s.*
3. Brewster's Optics, New Edition, corrected to 1853 . 1 vol. 3*s.* 6*d.*
4. Cooley's Maritime and Inland Discovery . . 3 vols. 10*s.* 6*d.*
5. Crowe's History of France, 3 vols. 10*s.* 6*d.*
6. De Morgan on Probabilities, 1 vol. 3*s.* 6*d.*
7. De Sismondi's History of the Italian Republics . 1 vol. 3*s.* 6*d.*
8. De Sismondi's Fall of the Roman Empire . . 2 vols. 7*s.*
9. Donovan's Chemistry . 1 vol. 3*s.* 6*d.*
10. Donovan's Domestic Economy . . . . 2 vols. 7*s.*
11. Dunham's Spain and Portugal . . . . 5 vols. 17*s.* 6*d.*
12. Dunham's History of Denmark, Sweden, and Norway . . . . 3 vols. 10*s.* 6*d.*
13. Dunham's History of Poland . . . . 1 vol. 3*s.* 6*d.*
14. Dunham's Germanic Empire . . . . 3 vols. 10*s.* 6*d.*
15. Dunham's Europe during the Middle Ages . . 4 vols. 14*s.*
16. Dunham's British Dramatists . . . . 2 vols. 7*s.*
17. Dunham's Lives of Early Writers of Great Britain, 1 vol. 3*s.* 6*d.*
18. Fergus's History of the United States . . 2 vols. 7*s.*
19. Fosbroke's Greek and Roman Antiquities . . 2 vols. 7*s.*
20. Forster's Lives of the Statesmen of the Commonwealth . . . 5 vols. 17*s.* 6*d.*
21. Gleg's Lives of Military Commanders . . 3 vols. 10*s.* 6*d.*
22. Grattan's History of the Netherlands . . . 1 vol. 3*s.* 6*d.*
23. Henslow's Botany . . 1 vol. 3*s.* 6*d.*
24. Herschel's Astronomy . 1 vol. 3*s.* 6*d.*
25. Herschel's Discourse on Natural Philosophy . 1 vol. 3*s.* 6*d.*
26. History of Rome . 2 vols. 7*s.*
27. History of Switzerland . 1 vol. 3*s.* 6*d.*
28. Holland's Treatise on the Manufactures in Metal, 3 vols. 10*s.* 6*d.*
29. James's Lives of Foreign Statesmen . . . 5 vols. 17*s.* 6*d.*
30. Kater and Lardner's Mechanics . . . 1 vol. 3*s.* 6*d.*
31. Keightley's Outlines of History . . . . 1 vol. 3*s.* 6*d.*
32. Lardner's Arithmetic . 1 vol. 3*s.* 6*d.*
33. Lardner's Geometry . 1 vol. 3*s.* 6*d.*
34. Lardner on Heat . . 1 vol. 3*s.* 6*d.*
35. Lardner's Hydrostatics and Pneumatics . . . 1 vol. 3*s.* 6*d.*
36. Lardner and Walker's Electricity and Magnetism, 2 vols. 7*s.*
37. Mackintosh, Forster, and Courtenay's Lives of British Statesmen . . 7 vols. 24*s.* 6*d.*
38. Mackintosh, Wallace, and Bell's History of England . . . . 10 vols. 35*s.*
39. Montgomery and Shelley's Eminent Italian, Spanish, and Portuguese Authors, 3 vols. 10*s.* 6*d.*
40. Moore's History of Ireland, 4 vols. 14*s.*
41. Nicolas's Chronology of History . . . 1 vol. 3*s.* 6*d.*
42. Phillips' Treatise on Geology, corrected to 1852 2 vols. 7*s.*
43. Powell's History of Natural Philosophy . . . 1 vol. 3*s.* 6*d.*
44. Porter's Treatise on the Manufacture of Silk . 1 vol. 3*s.* 6*d.*
45. Porter's Manufacture of Porcelain and Glass . 1 vol. 3*s.* 6*d.*
46. Roscoe's British Lawyers, 1 vol. 3*s.* 6*d.*
47. Scott's History of Scotland . . . . 2 vols. 7*s.*
48. Shelley's Lives of Eminent French Authors . . 2 vols. 7*s.*
49. Shuckard and Swainson's Insects . . . . 1 vol. 3*s.* 6*d.*
50. Southey's Lives of British Admirals . . . 5 vols. 17*s.* 6*d.*
51. Stebbing's Church History, 2 vols. 7*s.*
52. Stebbing's History of the Reformation . . 2 vols. 7*s.*
53. Swainson's Discourse on Natural History . . 1 vol. 3*s.* 6*d.*
54. Swainson's Natural History and Classification of Animals . . . 1 vol. 3*s.* 6*d.*
55. Swainson's Habits and Instincts of Animals . 1 vol. 3*s.* 6*d.*
56. Swainson's Birds . . 2 vols. 7*s.*
57. Swainson's Fish, Reptiles, etc. . . . . 2 vols. 7*s.*
58. Swainson's Quadrupeds . 1 vol. 3*s.* 6*d.*
59. Swainson's Shells and Shell-fish . . . . 1 vol. 3*s.* 6*d.*
60. Swainson's Animals in Menageries . . . . 1 vol. 3*s.* 6*d.*
61. Swainson's Taxidermy and Bibliography . . . 1 vol. 3*s.* 6*d.*
62. Thirlwall's History of Greece . . . . 8 vols. 28*s.*

LETTERS ON HAPPINESS, ADDRESSED TO A FRIEND.
By the Author of *Letters to My Unknown Friends*. Foolscap 8vo. 6*s*. cloth.

LETTERS TO MY UNKNOWN FRIENDS.
By a Lady. Third Edition. Foolscap 8vo. 6*s*. cloth.

LINDLEY.—AN INTRODUCTION TO BOTANY.
By Prof. J. Lindley, Ph.D., F.R.S. L.S. etc. New Edition, with Corrections and numerous Additions. 2 vols. 8vo. with Six Plates and numerous Woodcuts, 24*s*. cloth.

LINWOOD (W.)—ANTHOLOGIA OXONIENSIS;
Sive, Florilegium e lusibus poeticis diversorum Oxoniensium Græcis et Latinis decerptum. Curante Gulielmo Linwood, M.A. Ædis Christi Alummo. 8vo. 14*s*. cloth.

LITTON.—THE CHURCH OF CHRIST,
In its Idea, Attributes, and Ministry: with a particular reference to the Controversy on the Subject between Romanists and Protestants. By the Rev. Edward Arthur Litton, M.A., Vice-Principal of St. Edmund Hall, Oxford. 8vo. 16*s*. cloth.

LORIMER.—LETTERS TO A YOUNG MASTER MARINER
On some Subjects connected with his Calling. By the late Charles Lorimer. A New Edition. Foolscap 8vo. 5*s*. 6*d*. cloth.

LOUDON.—THE AMATEUR GARDENER'S CALENDAR:
Being a Monthly Guide, as to what should be avoided as well as what should be done in a Garden in each Month: with plain Rules *how to do* what is requisite; Directions for laying out and planting Kitchen and Flower Gardens, Pleasure Grounds, and Shrubberies; and a short account, in each Month, of the Quadrupeds, Birds, and Insects, then most injurious to Gardens. By Mrs. Loudon. 16mo. with numerous Wood Engravings, 7*s*. 6*d*. cloth.

LOUDON.—THE LADY'S COUNTRY COMPANION;
Or, How to Enjoy a Country Life Rationally. By Mrs. Loudon, author of "Gardening for Ladies," etc. Fourth Edition. Foolscap 8vo., with Plate and Woodcuts, 5*s*. cloth.

LOUDON'S SELF-INSTRUCTION FOR YOUNG GARDENERS,
Foresters, Bailiffs, Land Stewards, and Farmers; in Arithmetic, Book-keeping, Geometry, Mensuration, Practical Trigonometry, Mechanics, Land-Surveying, Levelling, Planning and Mapping, Architectural Drawing, and Isometrical Projection and Perspective; with Examples shewing their applications to Horticultural and Agricultural Purposes. With a Portrait and a Memoir. 8vo. with Wood Engravings, 7*s*. 6*d*. cloth.

LOUDON'S ENCYCLOPÆDIA OF TREES AND SHRUBS:
Being the *Arboretum et Fruticetum Britannicum* abridged: containing the Hardy Trees and Shrubs of Great Britain, Native and Foreign, scientifically and popularly described: with their Propagation, Culture, and Uses in the Arts. 8vo. with 2,000 Woodcuts, price 50*s*. cloth.

LOUDON'S ENCYCLOPÆDIA OF GARDENING:
Comprising the Theory and Practice of Horticulture, Floriculture, Arboriculture, and Landscape Gardening: including all the latest Improvements; a General History of Gardening in all Countries; and a Statistical View of its Present State; with Suggestions for its Future Progress in the British Isles. With many hundred Engravings on Wood. New Edition, corrected and improved by Mrs. Loudon. 8vo. 50*s*. cloth.

LOUDON'S ENCYCLOPÆDIA OF AGRICULTURE:
Comprising the Theory and Practice of the Valuation, Transfer, Laying-out, Improvement, and Management of Landed Property, and of the cultivation and economy of the Animal and Vegetable Productions of Agriculture, including all the latest improvements. Fifth Edition; with upwards of 1,100 Engravings on Wood. 8vo. 2*l*. 10*s*. cloth.

LOUDON'S ENCYCLOPÆDIA OF PLANTS:

Including all the Plants which are now found in, or have been introduced into, Great Britain, giving their Natural History, accompanied by such Descriptions, Engraved Figures, and Elementary Details, as may enable a beginner, who is a mere English reader, to discover the name of every Plant which he may find in flower, and acquire all the information respecting it which is useful and interesting. New Edition, corrected throughout and brought down to the year 1853, by Mrs. Loudon. *[In the press.*

LOUDON'S ENCYCLOPÆDIA OF COTTAGE, FARM, AND

VILLA ARCHITECTURE and FURNITURE. Containing Designs for Cottages, Villas, Farm Houses, Farmeries, Country Inns, Public Houses, Parochial Schools, etc.; with the requisite Fittings-up, Fixtures, and Furniture, and appropriate Offices, Gardens, and Garden Scenery: each Design accompanied by Analytical and Critical Remarks. New Edition, edited by Mrs. Loudon. 8vo. with 2,000 Woodcuts, 63*s.* cloth.

LOUDON'S HORTUS BRITANNICUS;

Or, Catalogue of all the Plants indigenous to, cultivated in, or introduced into Britain. An entirely New Edition corrected throughout: with a Supplement, including all the New Plants down to March, 1850; and a New General Index to the whole Work. Edited by Mrs. Loudon; assisted by W. H. Baxter and David Wooster. 8vo. 31*s.* 6*d.* cloth.

The SUPPLEMENT separately, price 14*s.* cloth.

LOW.—ELEMENTS OF PRACTICAL AGRICULTURE:

Comprehending the Cultivation of Plants, the Husbandry of the Domestic Animals, and the Economy of the Farm. By David Low, Esq. F.R.S.E. New Edition; with 200 Woodcuts. 8vo. 21*s.* cloth.

MACAULAY.—THE HISTORY OF ENGLAND,

From the Accession of James II. By Thomas Babington Macaulay. New Edition. Vols. I. and II. 8vo. 32*s.* cloth.

MR. MACAULAY'S CRITICAL AND HISTORICAL ESSAYS

CONTRIBUTED TO THE EDINBURGH REVIEW. Three Editions, as follows:—

1. LIBRARY EDITION (the Seventh), in 3 vols. 8vo. price 36*s.* cloth.
2. Complete in ONE VOLUME, with Portrait and Vignette. Square crown 8vo. price 21*s.* cloth; or 30*s.* handsomely bound in calf, by Hayday.
3. A NEW EDITION, in 3 vols. fcap. 8vo. price 21*s.* cloth.

MACAULAY.—LAYS OF ANCIENT ROME,

IVRY and THE ARMADA. By Thomas Babington Macaulay. New Edition. 16mo. 4*s.* 6*d.* cloth; morocco, 10*s.* 6*d.* (*bound by Hayday.*)

MR. MACAULAY'S LAYS OF ANCIENT ROME.

With numerous Illustrations, Original and from the Antique, drawn on Wood by George Scharf, jun. and engraved by Samuel Williams. New Edition. Fcap. 4to. 21*s.* boards; or 42*s.* bound in morocco, by Hayday.

MACDONALD.—VILLA VEROCCHIO; OR, THE YOUTH OF

LEONARDO DA VINCI: a Tale. By the late Diana Louisa Macdonald. Fcap. 8vo. 6*s.* cloth.

MACKINTOSH'S (SIR JAMES) MISCELLANEOUS WORKS:

Including his Contributions to The EDINBURGH REVIEW. A New Edition, complete in One Volume; with Portrait and Vignette. Square crown 8vo. 21*s.* cloth; or 30*s.* calf extra by Hayday.

M'LEOD AND WELLER'S SACRED ATLAS.—AN ATLAS OF

SCRIPTURE GEOGRAPHY. Adapted for the use of Training Colleges, Pupil Teachers, and the Upper Classes in Elementary Schools. Comprising Fifteen coloured Maps, and a Section, engraved on Ten Plates: with Illustrative Letterpress, by Walter M'Leod, F.R.G.S., Head Master of the Model School, and Master of Method in the Royal Military Asylum, Chelsea. The Maps compiled and engraved by Edward Weller, F.R.G.S. Royal 8vo. price 7*s.* half-bound.

M'CULLOCH.—A DICTIONARY, GEOGRAPHICAL, STATISTICAL, AND HISTORICAL, of the various Countries, Places, and Principal Natural Objects in the World. By J. R. M'Culloch, Esq. Illustrated with Six large Maps. New Edition, with a Supplement, comprising the Population of Great Britain from the Census of 1851. 2 vols. 8vo. 63*s.* cloth.—The SUPPLEMENT separately, price 3*s.* 6*d.*

M'CULLOCH.—A DICTIONARY, PRACTICAL, THEORETICAL, AND HISTORICAL, OF COMMERCE, AND COMMERCIAL NAVIGATION. Illustrated with Maps and Plans. By J. R. M'Culloch, Esq. A New Edition, corrected, enlarged, and improved: including a New Supplement. 8vo. 50*s.* cloth; or 55*s.* strongly half-bound in russia.—The SUPPLEMENT separately, price 4*s.* 6*d.*

M'CULLOCH.—AN ACCOUNT, DESCRIPTIVE, AND STATISTICAL, of the BRITISH EMPIRE; exhibiting its Extent, Physical Capacities, Population, Industry, and Civil and Religious Institutions. By J. R. M'Culloch, Esq. 3d Edition, corrected, enlarged, and greatly improved. 2 vols. 8vo. 42*s.* cloth.

M'CULLOCH.—A TREATISE ON THE PRINCIPLES AND PRACTICAL INFLUENCE OF TAXATION AND THE FUNDING SYSTEM. By J. R. M'Culloch, Esq. Second Edition, corrected, enlarged, and improved. 8vo. 16*s.* cloth.

M'CULLOCH.—A TREATISE ON THE CIRCUMSTANCES WHICH DETERMINE THE RATE OF WAGES AND THE CONDITION OF THE LABOURING CLASSES. By J. R. M'Culloch, Esq. Fcap. 8vo. 3*s.* 6*d.* cloth.

MAITLAND.—THE CHURCH IN THE CATACOMBS:
A Description of the Primitive Church of Rome, illustrated by its Sepulchral Remains. By Charles Maitland. New Edition, revised; with numerous Woodcuts. 8vo. 14*s.* cloth.

MRS. MARCET'S CONVERSATIONS ON CHEMISTRY:
In which the Elements of that Science are familiarly Explained and Illustrated by Experiments. New Edition, corrected. 2 vols. foolscap 8vo. 14*s.* cloth.

MRS. MARCET'S CONVERSATIONS ON POLITICAL ECONOMY: In which the Elements of that Science are familiarly explained. New Edition, revised, and enlarged. Foolscap 8vo. 7*s.* 6*d.* cloth.

MRS. MARCET'S CONVERSATIONS ON NATURAL PHILOSOPHY. In which the Elements of that Science are familiarly explained, and adapted to the comprehension of Young Persons. New Edition, greatly improved. Fcap. 8vo. with 23 Plates, 10*s.* 6*d.* cloth.

MRS. MARCET'S CONVERSATIONS ON VEGETABLE PHYSIOLOGY; comprehending the Elements of Botany, with their Application to Agriculture. New Edition. Foolscap 8vo. with Four Plates, 9*s.* cloth.

MRS. MARCET'S CONVERSATIONS ON LAND AND WATER.
New Edition, revised and corrected. Foolscap 8vo. with coloured Map shewing the comparative Altitude of Mountains, 5*s.* 6*d.* cloth.

MARIOTTI.—FRA DOLCINO AND HIS TIMES:
Being an Account of a General Struggle for Ecclesiastical Reform, and of an Anti-Heretical Crusade in Italy, in the early part of the Fourteenth Century. By L. Mariotti, Author of *Italy, Past and Present*, etc. Post 8vo. price 10*s.* 6*d.* cloth.

MARTINEAU.—CHURCH HISTORY IN ENGLAND,
From the Earliest Times to the Period of the Reformation. By the Rev. Arthur Martineau, M.A., late Fellow of Trinity College, Cambridge. 12mo. [*In the press.*

MAUNDER'S SCIENTIFIC AND LITERARY TREASURY:
A New and Popular Encyclopædia of Science and the Belles Lettres; including all Branches of Science, and every subject connected with Literature and Art. New Edition. Fcap. 8vo. 10*s.* cloth; bound in roan, 12*s.*; calf lettered, 12*s.* 6*d.*

MAUNDER'S HISTORICAL TREASURY;
Comprising a General Introductory Outline of Universal History, Ancient and Modern, and a Series of separate Histories of every principal Nation that exists; developing their Rise, Progress, and Present Condition, the Moral and Social Character of their respective inhabitants, their Religion, Manners, and Customs, etc. An entirely New Edition; revised throughout, and brought down to the Present Time. Foolscap 8vo. 10*s.* cloth; bound in roan, 12*s.*; calf lettered, 12*s.* 6*d.*

MAUNDER'S TREASURY OF NATURAL HISTORY;
Or, a Popular Dictionary of Animated Nature: In which the Zoological Characteristics that distinguish the different Classes, Genera, and Species are combined with a variety of interesting Information illustrative of the Habits, Instincts, and General Economy of the Animal Kingdom. Embellished with 900 Engravings on Wood. New Edition. Fcap. 8vo. 10*s.* cloth; bound in roan, 12*s.*; calf lettered, 12*s.* 6*d.*

MAUNDER'S TREASURY OF KNOWLEDGE,
And LIBRARY of REFERENCE: Comprising an English Dictionary and Grammar, an Universal Gazetteer, a Classical Dictionary, a Chronology, a Law Dictionary, a Synopsis of the Peerage, numerous useful Tables, etc. The Twentieth Edition (1853), carefully revised and corrected throughout, with some Additions. Foolscap 8vo. 10*s.* cloth; bound in roan, 12*s.*; calf lettered, 12*s.* 6*d.*

MAUNDER'S BIOGRAPHICAL TREASURY;
Consisting of Memoirs, Sketches, and brief Notices of above 12,000 Eminent Persons of all Ages and Nations, from the Earliest Period of History; forming a new and complete Dictionary of Universal Biography. A New and carefully revised Edition; corrected throughout, and extended by the introduction of numerous additional Lives. Foolscap 8vo. 10*s.* cloth; bound in roan, 12*s.*; calf lettered, 12*s.* 6*d.*

MERIVALE.—A HISTORY OF THE ROMANS UNDER THE EMPIRE. By the Rev. Charles Merivale, late Fellow of St. John's College, Cambridge. Vols. I. and II. 8vo. 28*s.* cloth. Vol. III. completing the History to the Establishment of the Monarchy by Augustus. 8vo. 14*s.* cloth.

MERIVALE.—THE FALL OF THE ROMAN REPUBLIC:
A Short History of the last Century of the Commonwealth. By the Rev. Charles Merivale, B.D., late Fellow of St. John's College, Cambridge. 12mo.

MILNER.—THE HISTORY OF THE CHURCH OF CHRIST.
By the late Rev. Joseph Milner, A.M., With additions by the late Rev. Isaac Milner, D.D. F.R.S. A New Edition, revised, with additional Notes by the Rev. Thomas Grantham, B.D. 4 vols. 8vo. price 52*s.* cloth.

MONTGOMERY.—ORIGINAL HYMNS FOR PUBLIC, SOCIAL, AND PRIVATE DEVOTION. By James Montgomery. 18mo. price 5*s.* 6*d.* cloth.

JAMES MONTGOMERY'S POETICAL WORKS.
With some additional Poems, and the Author's Autobiographical Prefaces. A New Edition, complete in One Volume; with Portrait and Vignette. Square crown 8vo. 10*s.* 6*d.* cloth; morocco, 21*s.*—Or in 4 vols. foolscap 8vo. with Portrait, and Seven other Plates, 20*s.* cloth; bound in morocco, 1*l.* 16*s.*

MOORE.—HEALTH, DISEASE, AND REMEDY,
Familiarly and Practically considered in a few of their Relations to the Blood. By George Moore, M.D. Post 8vo. 7*s.* 6*d.* cloth.

MOORE.—THE POWER OF THE SOUL OVER THE BODY.
Considered in relation to Health and Morals. By George Moore, M.D. Member of the Royal College of Physicians, etc. Fifth Edition. Fcap. 8vo. 6*s.* cloth.

MOORE.—THE USE OF THE BODY IN RELATION TO THE MIND. By George Moore, M.D. Third Edition. Fcap. 8vo. 6*s.* cloth.

MOORE.—MAN AND HIS MOTIVES.
By George Moore, M.D. Third Edition. Fcap. 8vo. 6*s.* cloth.

MOORE.—MEMOIRS, JOURNAL, AND CORRESPONDENCE
OF THOMAS MOORE. Edited by the Right Hon. Lord John Russell. With Portraits and Vignette Illustrations. Vols. I. and II. post 8vo. price 21*s.* cloth.

THE THIRD AND FOURTH VOLUMES OF MOORE'S SERMONS, JOURNAL, AND CORRESPONDENCE, with Portraits of Sir John Stevenson and Samuel Rogers, Esq.; and Vignettes, by T. Creswick, R.A., of the Meeting of the Waters, and Moore's Residence at Mayfield. Vols. III. and IV. post 8vo. price 21*s.* cloth.

MOORE'S POETICAL WORKS:
Containing the Author's recent Introduction and Notes. Complete in One Volume, uniform with Lord Byron's and Southey's Poems. With Portrait and View of Sloperton Cottage, Chippenham. Medium 8vo. 1*l.* 1*s.* cloth; or 42*s.* bound in morocco, by Hayday.

*** Also a New and Cheaper Issue of the First collected Edition of the above, in 10 vols. foolscap 8vo. with Portrait, and 19 Plates, price 35*s.* cloth.

THOMAS MOORE'S SONGS, BALLADS, AND SACRED SONGS.
First collected Edition, with Vignette by Richard Doyle. 16mo. 5*s.* cloth; or 12*s.* 6*d.* bound in smooth morocco, by Hayday.

MOORE'S IRISH MELODIES.
New Edition. With the Autobiographical Preface from the Collective Edition of Mr. Moore's Poetical Works, and a Vignette by D. Maclise, R.A. 16mo. 5*s.* cloth; 12*s.* 6*d.* bound in smooth morocco, by Hayday.—Or in foolscap 8vo. with Vignette by Corbould, 10*s.* cloth; bound in morocco, 13*s.* 6*d.*

MOORE'S IRISH MELODIES.
Illustrated by D. Maclise, R.A. New and cheaper Edition, with 161 Designs, and the whole of the Letter-press engraved on Steel, by F. P. Becker. Super royal 8vo. 31*s.* 6*d.* cloth; bound in morocco, by Hayday, 2*l.* 12*s.* 6*d.*

*** *The Original Edition, in imperial 8vo. 63s. boards; morocco, by Hayday, 4l. 14s. 6d.; Proofs, 6l. 6s. boards,—may still be had.*

MOORE'S LALLA ROOKH: AN ORIENTAL ROMANCE.
New Edition; with the Autobiographical Preface from the Collective Edition of Mr. Moore's Poetical Works, and a Vignette by D. Maclise, R.A. 16mo. 5*s.* cloth; 12*s.* 6*d.* bound in smooth morocco, by Hayday.—Or in foolscap 8vo. with 4 Plates by Westall, 10*s.* 6*d.* cloth; or 14*s.* bound in morocco.

MOORE'S LALLA ROOKH: AN ORIENTAL ROMANCE.
With 13 highly-finished Steel Plates, from Designs by Corbould, Meadows, and Stephanoff, engraved under the superintendence of the late Charles Heath. New Edition. Square crown 8vo. 15*s.* cloth; morocco, 28*s.*—*A few copies of the Original Edition, in royal 8vo. price One Guinea, still remain.*

MOSELEY.—ILLUSTRATIONS OF PRACTICAL MECHANICS.
By the Rev. H. Moseley, M.A., Professor of Natural Philosophy and Astronomy in King's College, London. New Edition. Fcap. 8vo. with Woodcuts, 8*s.* cloth.

MOSELEY.—THE MECHANICAL PRINCIPLES OF ENGINEERING AND ARCHITECTURE. By the Rev. H. Moseley, M.A. F.R.S. 8vo. 24*s.* cloth.

MOSHEIM'S ECCLESIASTICAL HISTORY,
Ancient and Modern. Translated, with copious Notes, by James Murdock, D.D. New Edition, revised, and continued, by the Rev. Henry Soames, M.A. 4 vols. 8vo. 48*s.* cloth.

MURE.—A CRITICAL HISTORY OF THE LANGUAGE AND LITERATURE OF ANCIENT GREECE. By William Mure, M.P., of Caldwell. 3 vols. 8vo. 36*s.* cloth. Vol. IV. comprising Historical Literature from the Rise of Pure Composition to the Death of Herodotus. 8vo. with Map, price 15*s.* cloth.

MURRAY'S ENCYCLOPÆDIA OF GEOGRAPHY:
Comprising a complete Description of the Earth: exhibiting its Relation to the Heavenly Bodies, its Physical Structure, the Natural History of each Country, and the Industry, Commerce, Political Institutions, and Civil and Social State of all Nations. Second Edition; with 82 Maps, and upwards of 1,000 other Wood Engravings. 8vo. 3*l.* cloth.

NEALE.—RISEN FROM THE RANKS;
Or, Conduct *versus* Caste. By the Rev. Erskine Neale, M.A. Rector of Kirton, Suffolk. Fcap. 8vo. [*Nearly ready.*

NEALE.—THE RICHES THAT BRING NO SORROW.
By the Rev. Erskine Neale, M.A., Rector of Kirton, Suffolk. Foolscap 8vo. 6*s.* cloth.

THE EARTHLY RESTING-PLACES OF THE JUST.
By the Rev. Erskine Neale, M.A., Rector of Kirton, Suffolk. Fcap. 8vo. 7*s.* cloth.

NEALE.—THE CLOSING SCENE;
Or, Christianity and Infidelity contrasted in the Last Hours of Remarkable Persons. By the Rev. Erskine Neale, M.A., New Editions. 2 vols. fcap. 8vo. 6*s.* each.

NEWMAN.—DISCOURSES ADDRESSED TO MIXED CONGREGATIONS. By John Henry Newman, Priest of the Oratory of St. Philip Neri. Second Edition. 8vo. 12*s.* cloth.

LIEUTENANT OSBORN'S ARCTIC JOURNAL.
STRAY LEAVES FROM AN ARCTIC JOURNAL; or, Eighteen Months in the Polar Regions in search of Sir John Franklin's Expedition. By Lieut. Sherard Osborn, R.N., Commanding H.M.S.V. *Pioneer*. With Map and Four coloured Plates. Post 8vo. price 12*s.* cloth.

OWEN JONES.—WINGED THOUGHTS.
A Series of Poems. By Mary Anne Bacon. With Illustrations of Birds, designed by E. L. Bateman, and executed in illuminated printing by Owen Jones. Imperial 8vo. 31*s.* 6*d.* elegantly bound in calf.

OWEN JONES.—FLOWERS AND THEIR KINDRED THOUGHTS: A Series of Stanzas. By Mary Anne Bacon. With beautiful Illustrations of Flowers, designed and printed in Colours by Owen Jones. Imperial 8vo. 31*s.* 6*d.* elegantly bound in calf.

OWEN JONES.—FRUITS FROM THE GARDEN AND THE FIELD. A Series of Stanzas. By Mary Anne Bacon. With beautiful Illustrations of Fruit, designed and printed in Colours by Owen Jones. Imperial 8vo. 31*s.* 6*d.* elegantly bound in calf.

OWEN.—LECTURES ON THE COMPARATIVE ANATOMY AND PHYSIOLOGY OF THE INVERTEBRATE ANIMALS, delivered at the Royal College of Surgeons in 1843. By Richard Owen, F.R.S. Hunterian Professor to the College. New Edition, corrected. 8vo. with Woodcuts. [*Nearly ready.*

PROFESSOR OWEN'S LECTURES ON THE COMPARATIVE ANATOMY AND PHYSIOLOGY of the VERTEBRATE ANIMALS, delivered at the Royal College of Surgeons in 1844 and 1846. Vol. I., with Woodcuts. 8vo. 14*s.* cloth.

THE COMPLETE WORKS OF BLAISE PASCAL:
With M. Villemain's Essay on Pascal considered as a Writer and Moralist, prefixed to the *Provincial Letters*; and the *Miscellaneous Writings*, *Thoughts on Religion*, and *Evidences of Christianity*, rearranged, with large Additions, from the French Edition of Mons. P. Faugère. Translated from the French, with Memoir, Introductions to the various Works, Editorial Notes, and Appendices, by George Pearce, Esq. 3 vols. post 8vo. with Portrait, 25*s.* 6*d.* cloth.

Vol. I.—PASCAL'S PROVINCIAL LETTERS: with M. Villemain's Essay on Pascal prefixed, and a new Memoir. Post 8vo. Portrait, 8*s.* 6*d.* cloth.

Vol. II.—THE THOUGHTS ON RELIGION, AND EVIDENCES OF CHRISTIANITY, with Additions from original MSS.: from M. Faugère's Edition. Post 8vo. 8*s.* 6*d.* cloth.

Vol. III.—PASCAL'S MISCELLANEOUS WRITINGS, CORRESPONDENCE, DETACHED THOUGHTS, etc. from M. Faugère's Edition. Post 8vo. 8*s.* 6*d.* cloth.

PASHLEY.—PAUPERISM AND POOR LAWS.
By Robert Pashley, M.A., F.C.P.S., One of Her Majesty's Counsel, and late Fellow of Trinity College, Cambridge; Author of *Travels in Crete*. 8vo. price 10*s.* 6*d.*, cloth.

CAPTAIN PEEL'S TRAVELS IN NUBIA.—A RIDE THROUGH THE NUBIAN DESERT. By Captain W. Peel, R.N. Post 8vo. with a Route Map from Cairo to Kordofan, price 5*s.* cloth.

PEREIRA.—A TREATISE ON FOOD AND DIET:
With Observations on the Dietetical Regimen suited for Disordered States of the Digestive Organs; and an Account of the Dietaries of some of the principal Metropolitan and other Establishments for Paupers, Lunatics, Criminals, Children, the Sick, etc. By Jon. Pereira, M.D. F.R.S., author of *Elements of Materia Medica*. 8vo. 16*s.* cloth.

PESCHEL'S ELEMENTS OF PHYSICS.
Translated from the German, with Notes, by E. West. With Diagrams and Woodcuts. 3 vols. fcap. 8vo. 21*s.* cloth.

PETERBOROUGH.—A MEMOIR OF CHARLES MORDAUNT, EARL OF PETERBOROUGH AND MONMOUTH: With Selections from his Correspondence. By the Author of *Hochelaga* and *The Conquest of Canada*. 2 vols. post 8vo. [*In the press.*

PHILLIPS'S ELEMENTARY INTRODUCTION TO MINERALOGY. A New Edition, with extensive Alterations and Additions, by H. J. Brooke, F.R.S., F.G.S.; and W. H. Miller, M.A., F.R.S., F.G.S., Professor of Mineralogy in the University of Cambridge. With numerous Wood Engravings. Post 8vo. price 18*s.* cloth.

PHILLIPS.—FIGURES AND DESCRIPTIONS OF THE PALÆOZOIC FOSSILS OF CORNWALL, DEVON, and WEST SOMERSET; observed in the course of the Ordnance Geological Survey of that District. By John Phillips, F.R.S. F.G.S. 8vo. with 60 Plates, comprising very numerous Figures, 9*s.* cloth.

PORTLOCK.—REPORT ON THE GEOLOGY OF THE COUNTY OF LONDONDERRY, and of Parts of Tyrone and Fermanagh, examined and described under the Authority of the Master-General and Board of Ordnance. By J. E. Portlock, F.R.S. etc. 8vo. with 48 Plates, 24*s.* cloth.

POWER.—SKETCHES IN NEW ZEALAND,
with Pen and Pencil. By W. Tyrone Power, D.A.C.G. From a Journal kept in that Country, from July 1846 to June 1848. With 8 Plates and 2 Woodcuts. Post 8vo. 12*s.* cloth.

THE VADE-MECUM OF FLY-FISHING FOR TROUT:
Being a complete Practical Treatise on that Branch of the Art of Angling; with plain and copious Instructions for the Manufacture of Artificial Flies. By G. P. R. Pulman. Third Edition, with several Woodcuts. Fcap. 8vo. 6*s.* cloth.

PYCROFT.—A COURSE OF ENGLISH READING;
Adapted to every Taste and Capacity. With Literary Anecdotes. By the Rev. James Pycroft, B.A., author of *The Collegian's Guide*. New Edition. Fcap. 8vo. 5*s.* cloth.

DR. REECE'S MEDICAL GUIDE:
For the use of the Clergy, Heads of Families, Schools, and Junior Medical Practitioners. Comprising a complete Modern Dispensatory, and a Practical Treatise on the distinguishing Symptoms, Causes, Prevention, Cure, and Palliation of the Diseases incident to the Human Frame. With the latest Discoveries in the different Departments of the Healing Art, Materia Medica, etc. Seventeenth Edition, with considerable Additions; revised and corrected by the Author's Son, Dr. Henry Reece, M.R.C.S. etc. 8vo. 12*s.* cloth.

RICH.—THE ILLUSTRATED COMPANION TO THE LATIN DICTIONARY AND GREEK LEXICON: forming a Glossary of all the Words respecting Visible Objects connected with the Arts, Manufactures, and Every-day Life of the Ancients. With Representations of nearly Two Thousand Objects from the Antique. By Anthony Rich, jun. B.A., Post 8vo. with about 2,000 Woodcuts, 21*s.* cloth.

JOURNAL OF A BOAT VOYAGE THROUGH RUPERT'S LAND and the Central Arctic Sea, in Search of the Discovery Ships under command of Sir John Franklin. With an Appendix on the Physical Geography of North America. By Sir John Richardson, C.B., F.R.S., etc., Inspector of Naval Hospitals and Fleets. With a coloured Map, several Plates and Woodcuts. 2 vols. 8vo. 31*s.* 6*d.* cloth.

RIDDLE.—A COPIOUS AND CRITICAL LATIN-ENGLISH LEXICON, founded on the German-Latin Dictionaries of Dr. William Freund. By the Rev. J. E. Riddle, M.A., of St. Edmund Hall, Oxford. New Edition, with Corrections. Post 4to. 31*s.* 6*d.* cloth.

RIDDLE'S COMPLETE LATIN-ENGLISH AND ENGLISH-LATIN DICTIONARY, for the use of Colleges and Schools. New Edition, revised and corrected. 8vo. 21*s.* cloth.

*** *Separately* { THE ENGLISH-LATIN DICTIONARY, price 15*s.*
THE LATIN-ENGLISH DICTIONARY, price 7*s.*

RIDDLE'S DIAMOND LATIN-ENGLISH DICTIONARY:
A Guide to the Meaning, Quality, and right Accentuation of Latin Classical Words. New Edition. Royal 32mo. 4*s.* bound.

RIVERS.—THE ROSE AMATEUR'S GUIDE:
Containing ample Descriptions of all the fine leading varieties of Roses, regularly classed in their respective Families; their History and Mode of Culture. By T. Rivers, Jun. Fourth Edition, corrected and improved. Foolscap 8vo. 6*s*. cloth.

ROBINSON'S LEXICON TO THE GREEK TESTAMENT.
A Greek and English Lexicon of the New Testament. By Edward Robinson, D.D. LL.D. Professor of Biblical Literature in the Union Theological Seminary, New York; Author of *Biblical Researches in Palestine*, etc. New Edition, revised and in great part re-written. 8vo. 18*s*. cloth.

ROGERS'S VEGETABLE CULTIVATOR;
Containing a plain and accurate Description of every species and variety of Culinary Vegetables: With the most approved Modes of Cultivating and Cooking them. New and cheaper Edition. Fcap. 8vo. 5*s*. cloth.

ROGERS.—ESSAYS SELECTED FROM CONTRIBUTIONS TO THE EDINBURGH REVIEW. By Henry Rogers. 2 vols. 8vo. 24*s*. cloth.

ROGET.—THESAURUS OF ENGLISH WORDS AND PHRASES
classified and arranged so as to facilitate the Expression of Ideas and assist in Literary Composition. By P. M. Roget, M.D., F.R.S. Second Edition, revised and enlarged. Medium 8vo. price 14*s*. cloth.

ROWTON (F.)—THE DEBATER:
Being a Series of complete Debates, Outlines of Debates, and Questions for Discussion. With ample references to the best sources of information upon each particular topic. By Frederic Rowton. Second Edition. Foolscap 8vo. 6*s*. cloth.

ST. JOHN (H.)—THE INDIAN ARCHIPELAGO;
Its History and Present State. By Horace St. John, Author of *History of the British Conquests in India*, *Life of Christopher Columbus*, etc. 2 vols. post 8vo. price 21s. cloth.

MR. ST. JOHN'S NEW WORK ON EGYPT.—ISIS:
An Egyptian Pilgrimage. By James Augustus St. John. 2 vols. post 8vo. price 21s. cloth.

THE SAINTS OUR EXAMPLE.
By the Author of *Letters to My Unknown Friends*, *Letters on Happiness*, etc. Fcap. 8vo. price 7*s*. cloth.

SIR EDWARD SEAWARD'S NARRATIVE OF HIS SHIPWRECK, and consequent Discovery of certain Islands in the Caribbean Sea: with a Detail of many extraordinary and highly interesting Events in his Life, from 1733 to 1749, as written in his own Diary. Edited by Jane Porter. Third Edition. 2 vols. post 8vo. 21*s*. cloth.—Also an Abridgement, in 16mo. price Half-a-Crown.

SELF-DENIAL THE PREPARATION FOR EASTER.
By the Author of *Letters to My Unknown Friends*. Foolscap 8vo. price 2*s*. 6*d*. cloth.

SEWELL.—AMY HERBERT.
By a Lady. Edited by the Rev. William Sewell, B.D., Fellow and Tutor of Exeter College, Oxford. New Edition, complete in One volume. Foolscap 8vo. price 6*s*. cloth.

SEWELL.—THE EARL'S DAUGHTER.
By the Author of *Amy Herbert*. Edited by the Rev. W. Sewell, B.D. 2 vols. fcap. 8vo. 9*s*. cloth.

SEWELL.—GERTRUDE.

A Tale. By the Author of *Amy Herbert*. Edited by the Rev. W. Sewell, B.D. New Edition, complete in One volume. Foolscap 8vo. price 6*s*. cloth.

SEWELL.—LANETON PARSONAGE:

A Tale for Children, on the practical Use of a Portion of the Church Catechism. By the author of *Amy Herbert*. Edited by the Rev. W. Sewell, B.D. New Edition. 3 vols. fcap. 8vo. 16*s*. cloth.

SEWELL.—MARGARET PERCIVAL.

By the Author of *Amy Herbert*. Edited by the Rev. W. Sewell, B.D. New Edition. 2 vols. foolscap 8vo. 12*s*. cloth.

THE FAMILY SHAKSPEARE,

In which nothing is added to the Original Text; but those Words and Expressions are omitted which cannot with propriety be read aloud. By T. Bowdler, Esq. F.R.S. New Edition (1853), in volumes for the Pocket. 6 vols. foolscap 8vo. price 30*s*. cloth.

*** Also a Library Edition; with 36 Illustrations after Smirke, etc. 8vo. 21*s*. cloth

SONGS AND BALLADS OF SHAKSPEARE.

Illustrated in 18 Plates by the Etching Club. Imperial 4to. 42*s*. boards.

*** The first Nine Plates were originally published in 1843; and the Subscribers to those Plates may purchase the last Nine separately, price 21*s*.

SHARP'S NEW BRITISH GAZETTEER,

OR TOPOGRAPHICAL DICTIONARY OF THE BRITISH ISLANDS AND NARROW SEAS: Comprising concise Descriptions of about Sixty Thousand Places, Seats, Natural Features, and Objects of Note, founded on the best Authorities; full Particulars of the Boundaries, Registered Electors, etc. of the Parliamentary Boroughs; with a Reference under every Name to the Sheet of the Ordnance Survey, as far as completed; and an Appendix, containing a General View of the Resources of the United Kingdom, a short Chronology, and an Abstract of certain Results of the Census of 1851. 2 vols. 8vo. 2*l*. 16*s*. cloth.

SHORT WHIST: ITS RISE, PROGRESS, AND LAWS;

With the recent Decisions of the Clubs, and Observations to make any one a Whist Player. Containing also the Laws of Piquet, Cassino, Ecarte, Cribbage, Backgammon. By Major A. New Edition. To which are added, Precepts for Tyros. By Mrs. B. Foolscap 8vo. 3*s*. cloth, gilt edges.

SINCLAIR.—THE JOURNEY OF LIFE.

By Catherine Sinclair. New Edition, corrected and enlarged. Fcap. 8vo. 5*s*. cloth.

SINCLAIR.—POPISH LEGENDS OR BIBLE TRUTHS.

By Catherine Sinclair. Dedicated to her Nieces. Fcap. 8vo. 6*s*. cloth.

SIR ROGER DE COVERLEY.

From *The Spectator*. With Notes and Illustrations by W. Henry Wills; and Twelve fine Wood Engravings by John Thompson from Designs by Frederick Tayler. Crown 8vo. 15*s*. boards; or 27*s*. bound in morocco by Hayday.—Also a Cheap Edition, without Engravings, in 16mo. price One Shilling.

SKETCHES BY A SAILOR;

Or, Things of Earth and Things of Heaven. By a Commander in the Royal Navy. Contents:—1. The Shipwreck; 2. The Model Prison; 3. The Foot Race; 4. A Man Overboard; 5. The Assize Court; 6. The Fugitive. Fcap. 8vo. price 3*s*. 6*d*. cloth.

SMEE.—ELEMENTS OF ELECTRO-METALLURGY.

By Alfred Smee, F.R.S., Surgeon to the Bank of England. Third Edition, considerably enlarged; with Electrotypes and numerous Woodcuts. Post 8vo. 10*s.* 6*d.* cloth.

THE WORKS OF THE REV. SYDNEY SMITH.

Comprising the Author's Miscellaneous Writings, and Contributions to the Edinburgh Review. New Edition, complete in One Volume; with Portrait and Vignette. Square crown 8vo. 21*s.* cloth; 30*s.* calf extra, by Hayday,—Or in 3 vols. 8vo. with Portrait, 36*s.* cloth.

SMITH.—ELEMENTARY SKETCHES OF MORAL PHILOSOPHY,

delivered at the Royal Institution in the Years 1804, 1805, and 1806. By the late Rev. Sydney Smith, M.A. Second Edition. 8vo. 12*s.* cloth.

SMITH.—THE VOYAGE AND SHIPWRECK OF ST. PAUL:

with Dissertations on the Sources of the Writings of St. Luke, and the Ships and Navigation of the Ancients. By James Smith, Esq., F.R.S. etc. 8vo. with Illustrations, 14*s.* cloth.

SNOW.—VOYAGE OF THE PRINCE ALBERT IN SEARCH OF SIR JOHN FRANKLIN.

A Narrative of Every-day Life in the Arctic Seas. By W. Parker Snow. With a Chart, and 4 Illustrations printed in colours. Post 8vo. 12*s.* cloth.

THE LIFE AND CORRESPONDENCE OF THE LATE ROBERT SOUTHEY.

Edited by his Son, the Rev. Charles Cuthbert Southey, M.A. Vicar of Ardleigh. With numerous Portraits; and Six Landscape Illustrations from Designs by W. Westall, A.R.A. 6 vols. post 8vo. 63*s.* cloth.

SOUTHEY'S COMMON-PLACE BOOKS.

THE COMMON-PLACE BOOKS of the late Robert Southey. Comprising—1. Choice Passages; with Collections for the History of Manners and Literature in England; 2. Special Collections on various Historical and Theological Subjects; 3. Analytical Readings in various branches of Literature; and 4. Original Memoranda, Literary and Miscellaneous. Edited by the Rev. John Wood Warter, B.D. 4 vols. square crown 8vo. 3*l.* 18*s.* cloth.

Each Common-Place Book, complete in itself, may be had separately as follows:—

FIRST SERIES—CHOICE PASSAGES, etc. 2d Edition; with Medallion. Price 18*s.*

SECOND SERIES—SPECIAL COLLECTIONS. Price 18*s.*

THIRD SERIES—ANALYTICAL READINGS. One Guinea.

FOURTH SERIES—ORIGINAL MEMORANDA, etc. One Guinea.

SOUTHEY'S THE DOCTOR ETC.

Complete in One Volume. Edited by the Rev. John Wood Warter. With Portrait, Vignette, Bust, and coloured Plate. New Edition. Square crown 8vo. 21*s.* cloth.

SOUTHEY'S LIFE OF WESLEY,

And Rise and Progress of Methodism. New Edition, with Notes by the late Samuel Taylor Coleridge; and Remarks on the Life and Character of John Wesley, by the late Alexander Knox. Edited by the Rev. C. C. Southey, M.A. 2 vols. 8vo. with two Portraits, 1*l.* 8*s.* cloth.

ROBERT SOUTHEY'S COMPLETE POETICAL WORKS:

Containing all the Author's last Introductions and Notes. Complete in One Volume, with Portrait and View of the Poet's Residence at Keswick; uniform with Lord Byron's and Moore's Poetical Works. Medium 8vo. 21*s.* cloth; 42*s.* bound in morocco, by Hayday.—Or in 10 vols. foolscap 8vo. with Portrait and 19 Plates, 2*l.* 10*s.*; morocco, 4*l.* 10*s.*

SOUTHEY'S SELECT WORKS OF THE BRITISH POETS,

From Chaucer to Lovelace inclusive. With Biographical Sketches by the late Robert Southey. Medium 8vo. 30*s.* cloth.

STEEL'S SHIPMASTER'S ASSISTANT,

For the use of Merchants, Owners and Masters of Ships, Officers of Customs, and all Persons connected with Shipping or Commerce; containing the Law and Local Regulations affecting the Ownership, Charge, and Management of Ships and their Cargoes; together with Notices of other Matters, and all necessary Information for Mariners. New Edition, rewritten throughout; and containing the New Passengers Act passed during the last Session of Parliament. Edited by Graham Willmore, Esq., M.A., Barrister-at-Law; George Clements, of the Customs, London; and William Tate, author of *The Modern Cambist*. 8vo. 28*s.* cloth.

STEPHEN.—LECTURES ON THE HISTORY OF FRANCE.

By the Right Honourable Sir James Stephen, K.C.B., LL.D., Professor of Modern History in the University of Cambridge. Second Edition. 2 vols. 8vo. 24*s.* cloth.

"These masterly Lectures by Sir James Stephen, successor to the lamented Professor Smythe in the University of Cambridge, although they take rather new ground, will be found to cast a flood of light on the external and internal histories of the French people, discussing as they do fully and with consummate ability, as was to be expected from the author of Ecclesiastical Biography, *the monarchical, judicial, and economical institutions of the Great Nation. . . . . The present Lectures are at once profound [and] discriminative. They are written in a style of singular fascination, and even to the general reader they present historical truth in the attractiveness of romance. We indulge the hope that they will attain a large circulation, especially among those classes who are so latetudinarium as to ignore the painful but palpable facts of ecclesiastical history."* Electic Review.

STEPHEN—ESSAYS IN ECCLESIASTICAL BIOGRAPHY.

From The Edinburgh Review. By the Right Honourable Sir James Stephen, K.B., LL.D Second Edition. 2 vols. 8vo. 24*s.* cloth.

STOW.—THE TRAINING SYSTEM, THE MORAL TRAINING

SCHOOL, AND THE NORMAL SEMINARY. By David Stow, Esq., Honorary Secretary to the Glasgow Normal Free Seminary. 8th Edition; with Plates and Woodcuts. Post 8vo. 6*s.* cloth.

SUTHERLAND.—JOURNAL OF A VOYAGE IN BAFFIN'S

BAY AND BARROW STRAITS, in the Years 1850 and 1851, Performed by H. M. Ships Lady Franklin and Sophia, under the command of Mr. William Penny, in search of the missing Crews of Her Majesty's Ships Erebus and Terror: with a Narrative of Sledge Excursions on the Ice of Wellington Channel; and Observations on the Natural History and Physical Features of the Countries and Frozen Seas visited. By Peter C. Sutherland, M.D., M.R.C.S.E., Surgeon to the Expedition. With Two coloured Charts by A. Petermann, Six Plates (four coloured), and numerous Wood Engravings. 2 vols. post 8vo. price 27*s.* cloth.

SWAIN.—ENGLISH MELODIES.

By Charles Swain. Fcap. 8vo. 6*s.* cloth; or bound in morocco, 12*s.*

SYMONS.—THE MERCANTILE MARINE LAW.

By Edward William Symons, Chief Clerk of the Thames Police Court. Fifth Edition, including the Act passed in 1851 to amend the Mercantile Marine Act of 1850, and the provisions of the New Act relating to the Merchant Seamen's Fund. 12mo. 5*s.* cloth.

TATE.—EXERCISES ON MECHANICS AND NATURAL

PHILOSOPHY; or, an Easy Introduction to Engineering. Containing various Applications of the Principle of Work: the Theory of the Steam-Engine, with simple Mechanics; Theorems and Problems on accumulated Work, etc. By Thomas Tate, F.R.A.S., of Kneller Training College, Twickenham. New Edition. 12mo. 2*s.* cloth.—KEY, price 3*s.* 6*d.*

"The object of this work is to remove an evil pointed out by Professor Moseley in his Report on the Hydraulic Machines of the Great Exhibition—the frequent sacrifice of capital and of much mechanical ingenuity, in English machinery as compared with French, from the want of a knowledge of mechanical laws. Mr. Tate enunciates the principles of his subject, and illustrates them by means of exercises conducted for the most part on algebraical and geometrical principles. Spectator.

TATE.—THE PRINCIPLES OF MECHANICAL PHILOSOPHY APPLIED TO INDUSTRIAL MECHANICS. Forming a Sequel to the Author's *Exercises on Mechanics and Natural Philosophy*. By Thomas Tate, F.R.A.S., of Kneller Training College, Twickenham. With about 200 Wood Engravings. 8vo. price 10*s.* 6*d.* cloth.

TATE.—ON THE STRENGTH OF MATERIALS:
Containing various original and useful Formulæ, specially applied to Tubular Bridges, Wrought Iron and Cast Iron Beams, etc. By Thomas Tate, F.R.A.S. 8vo. 5*s.* 6*d.* cloth.

TAYLER.—MARGARET; OR, THE PEARL.
By the Rev. Charles B. Tayler, M.A. New Edition. Foolscap 8vo. 6*s.* cloth.

TAYLER.—LADY MARY; OR, NOT OF THE WORLD.
By the Rev. Charles B. Tayler, M.A. New Edition. Foolscap 8vo. with Frontispiece 6*s.* 6*d.* cloth.

TAYLOR.—THE AUTOBIOGRAPHY OF B. R. HAYDON,
Historical Painter. Edited, and continued to the time of his Death, from his own Journals, by Tom Taylor, M.A. of the Inner Temple, Esq.; late Fellow of Trinity College, Cambridge; and late Professor of the English Language and Literature in University College, London. 3 vols. post 8vo. [*In the press.*

TAYLOR.—WESLEY AND METHODISM.
By Isaac Taylor. With a Portrait of Wesley. Post 8vo. 10*s.* 6*d.* cloth.

"*All the characteristics of early Methodism are analysed in the present volume with a discrimination, and described with a clearness, such as we might expect from the philosophical and eloquent author of the* Natural History of Enthusiasm. . . . . *Of the Methodism of the eighteenth century, the corporeal part remains in the Wesleyan Connexion; the soul of it, while partly animating that body, was transfused into all Christian Churches. How that great movement became a starting-point in our modern history, and how it was the source of what is the most characteristic of the present time, as contrasted with the corresponding period of last century, not in religion only, but in general tone of national feeling, and manners, and literature, Mr. Taylor ably shews.*" Literary Gazette.

TAYLOR.—LOYOLA: AND JESUITISM
In its Rudiments. By Isaac Taylor. With medallion Portrait. Post 8vo. 10*s.* 6*d.* cloth

THIRLWALL.—THE HISTORY OF GREECE.
By the Right Rev. the Lord Bishop of St. David's, (the Rev. Connop Thirlwall). An improved Library Edition; with Maps. 8 vols. 4*l.* 14*s.* cloth.—Also, an Edition in 8 vols. fcap. 8vo. with Vignette Titles, 1*l.* 8*s.* cloth.

HISTORY OF GREECE, FROM THE EARLIEST TIME
TO THE TAKING OF CORINTH BY THE ROMANS, B.C. 146, mainly based upon Bishop Thirlwall's History of Greece. By Dr. Leonhard Schmitz, F.R.S.E., Rector of the High School of Edinburgh. Second Edition. 12mo. 7*s.* 6*d.* cloth.

THOMAS'S MODERN PRACTICE OF PHYSIC:
Exhibiting the Symptoms, Causes, Prognostics, Morbid Appearances, and Treatment of the Diseases of All Climates. Eleventh Edition, thoroughly revised, corrected, and to a considerable extent rewritten, by Algernon Frampton, M.D., Physician to the London Hospital: assisted by Herbert Davies, M.D., Physician to the London Hospital; N. Parker, M.D., Assistant-Physician to the London Hospital; G. Critchett, F.R.C.S., Senior Assistant-Surgeon to the London Hospital; J. Wordsworth, F.R.C.S., Assistant-Surgeon to the London Hospital: Henry Powell, M.D., Edinburgh; and H. Letheby, M.D., Lecturer on Chemistry and Toxicology in the London Hospital Medical School. 2 vols. 8vo. price 28*s.* cloth.

THOMSON'S SEASONS.
Edited by Bolton Corney, Esq. Illustrated with Seventy-seven Designs drawn on Wood by the Members of the Etching Club. Engraved by Thompson and other eminent Engravers. Square crown 8vo. 21*s.* cloth; bound in morocco, by Hayday, 36*s.*

THOMSON'S TABLES OF INTEREST,

At Three, Four, Four-and-a-half, and Five per Cent., from One Pound to Ten Thousand, and from 1 to 365 Days, in a regular progression of Single Days; with Interest at all the above Rates, from One to Twelve Months, and from One to Ten Years. Also, Tables shewing the Exchange on Bills, etc. etc. New Edition. 12mo. 8*s.* bound.

THE THUMB BIBLE;

Or, Verbum Sempiternum. By J. Taylor. Being an Epitome of the Old and New Testaments in English Verse. New Edition, printed from the Edition of 1693, by C. Whittingham, Chiswick. 64mo. 1*s.* 6*d.* bound and clasped.

TOMLINE'S INTRODUCTION TO THE STUDY OF THE BIBLE; Being the First Volume of the Elements of Christian Theology; containing Proofs of the Authenticity and Inspiration of the Holy Scriptures; a Summary of the History of the Jews, an Account of the Jewish Sects; and a brief Statement of the Contents of the several Books of the Old Testament. New Edition. Foolscap 8vo. 5*s.* 6*d.* cloth.

TOWNSEND.—MODERN STATE TRIALS.

Revised and illustrated with Essays and Notes. By William Charles Townsend, Esq. M.A. Q.C. 2 vols. 8vo. 30*s.* cloth.

TOWNSEND.—THE LIVES OF TWELVE EMINENT JUDGES OF THE LAST AND OF THE PRESENT CENTURY. By W. Charles Townsend, Esq., M.A. Q.C. 2 vols. 8vo. 28*s.* cloth.

TURNER.—THE SACRED HISTORY OF THE WORLD,

Attempted to be Philosophically considered, in a Series of Letters to a Son. By Sharon Turner, F.S.A. and R.A.S.L. Eighth Edition, edited by the Rev. Sydney Turner. 3 vols. post 8vo. 31*s.* 6*d.* cloth.

TURNER.—A NEW EDITION OF SHARON TURNER'S HISTORY OF ENGLAND DURING THE MIDDLE AGES: Comprising the Reigns from William the Conqueror to the Accession of Henry VIII. 4 vols. 8vo. [*In the press.*

TURNER—THE HISTORY OF THE ANGLO-SAXONS,

From the Earliest Period to the Norman Conquest. By Sharon Turner, F.R.S. and R.A.S.L. The Seventh Edition. 3 vols. 8vo. 36*s.* cloth.

TURTON'S MANUAL OF THE LAND AND FRESH WATER SHELLS OF THE BRITISH ISLANDS. New Edition, with Additions. By John Edward Gray. Post 8vo. with Woodcuts, and 12 coloured Plates 15*s.* cloth.

URE.—DICTIONARY OF ARTS, MANUFACTURES, AND MINES: Containing a clear Exposition of their Principles and Practice. By Andrew Ure, M.D. F.R.S. M.G.S. M.A.S. Lond., M. Acad. N.S. Philad.; S. Ph. Soc. N. Germ. Hanov.; Mullii, etc. etc. 3d Edition, corrected. 8vo. with 1,241 Woodcuts. 50*s.* cloth.—Also SUPPLEMENT OF RECENT IMPROVEMENTS. 2d Edition. 8vo. 14*s.* cloth.

WATERTON.—ESSAYS ON NATURAL HISTORY,

Chiefly Ornithology. By Charles Waterton, Esq., author of *Wanderings in South America* With an Autobiography of the Author, and Views of Walton Hall. New Editions. 2 vols. foolscap 8vo. 10*s.* cloth.—*Separately*—Vol. I. (First Series), 5*s.* 6*d.* Vol. II. (Second Series), 4*s.* 6*d.*

THE TRAVELLER'S LIBRARY,

In course of Publication in Parts at One Shilling and in Volumes price Half-a-Crown each. Comprising books of valuable information and acknowledged merit, in a form adapted for reading while Travelling, and of a character that will render them worthy of preservation; but the *price* of which has hitherto confined them within a comparatively narrow circle of readers.

Already Published:—

WARREN HASTINGS. By Thomas Babington Macaulay. Price One Shilling.

LORD CLIVE. By Thomas Babington Macaulay. Price One Shilling.

*** Mr. Macaulay's Two Essays on Warren Hastings and Lord Clive may be had in One Volume, price Half-a-Crown.

WILLIAM PITT, EARL of CHATHAM. By Thomas Babington Macaulay. Price One Shilling.

RANKE'S HISTORY OF THE POPES. And GLADSTONE ON CHURCH AND STATE. By Thomas Babington Macaulay. Price One Shilling.

*** Mr. Macaulay's Essays on William Pitt, Ranke's History of the Popes, and Gladstone On Church and State, may be had in One Volume, price Half-a-Crown.

THE LIFE AND WRITINGS OF ADDISON. And HORACE WALPOLE. By Thomas Babington Macaulay. Price One Shilling.

LORD BACON. By Thomas Babington Macaulay. Price One Shilling.

*** Mr. Macaulay's Three Essays on Addison, Horace Walpole, and Lord Bacon, may be had in One Volume, price Half-a-Crown.

LORD BYRON. And, THE COMIC DRAMATISTS of the RESTORATION. By Thomas Babington Macaulay. Price One Shilling.

LORD JEFFREY'S TWO ESSAYS on SWIFT and RICHARDSON. Price One Shilling.

THE AUSTRALIAN COLONIES: their Origin and Present Condition. By William Hughes, F.R.G.S. Two Parts, price One Shilling each; or in One Volume, price Half-a-Crown.

LONDON IN 1850 and 1851. By J. R. M'Culloch, Esq. Price One Shilling.

MR. S. LAING'S JOURNAL OF A RESIDENCE IN NORWAY. Two Parts, price One Shilling each; or in One Volume, price Half-a-Crown.

EOTHEN; or, Traces of Travel brought Home from the East. Two Parts, price One Shilling each; or in One Volume, price Half-a-Crown.

IDA PFEIFFER'S LADY'S VOYAGE ROUND THE WORLD. Two Parts, price One Shilling each; or in One Volume, price Half-a-Crown.

HUC'S TRAVELS IN TARTARY, THIBET, and CHINA. Two Parts, price One Shilling each; in One Volume, price Half-a-Crown.

Mrs. JAMESON'S SKETCHES in CANADA and RAMBLES among the RED MEN. Two Parts, price One Shilling each; or in One Volume, price Half-a-Crown.

WERNE'S AFRICAN WANDERINGS. Two Parts, price One Shilling each; or in One Volume, price Half-a-Crown.

JERRMANN'S PICTURES from ST. PETERSBURG. Two Parts, price One Shilling each; or in One Volume, price Half-a-Crown.

MEMOIRS of a MAITRE D'ARMES; or Eighteen Months at St. Petersburg. By Alexander Dumas. Two Parts, One Shilling each; or in One Volume, price Half-a-Crown.

SIR EDWARD SEAWARD'S NARRATIVE of his SHIPWRECK. Abridged from the last Edition of the Original. Two Parts, One Shilling each; or in One Volume, price Half-a-Crown.

BRITTANY and the BIBLE; with Remarks on the French People and their Affairs. By I. Hope. Price One Shilling.

RANKE'S FERDINAND the FIRST and MAXIMILIAN the SECOND of AUSTRIA. Price One Shilling.

MEMOIR of the DUKE of WELLINGTON. Reprinted by permission from *The Times* Newspaper. Price One Shilling.

THE LEIPSIC CAMPAIGN. By the Rev. G. R. Gleig, M.A. Two Parts, One Shilling each; or in One Volume, price Half-a-Crown.

THOMAS HOLCROFT'S MEMOIRS. Reprinted (1852). Two Parts, price One Shilling each; or in One Volume, price Half-a-Crown.

LORD CARLISLE'S LECTURES AND ADDRESSES. Price One Shilling.

THE NATURAL HISTORY of CREATION. By T. Lindley Kemp, M.D. Price One Shilling.

ELECTRICITY and the ELECTRIC TELEGRAPH, etc. By Dr. George Wilson. Price One Shilling.

SIR ROGER DE COVERLEY. From the *Spectator*. With Notes and Illustrations by W. H. Wills. Price One Shilling.

ALARIC WATTS'S POETRY AND PAINTING.—LYRICS OF THE HEART;

with other Poems. By Alaric A. Watts. With Forty-one highly finished Line Engravings, executed expressly for this work by the most eminent Painters and Engravers. Square crown 8vo. price 31*s.* 6*d.* boards, or 45*s.* bound in morocco by Hayday. Proof Impressions, 63*s.* boards.—Plain Proofs, 41 Plates, demy 4to. (only 100 copies printed) 2*l.* 2*s.* in portfolio; India Proofs before letters, colombier 4to. (only 50 copies printed), 5*l.* 5*s.* in portfolio.

WEBSTER AND PARKES'S ENCYCLOPÆDIA OF DOMESTIC ECONOMY:

Comprising such subjects as are most immediately connected with Housekeeping; as, The Construction of Domestic Edifices, with the Modes of Warming, Ventilating, and Lighting them—A Description of the various Articles of Furniture, with the Nature of their Materials—Duties of Servants, etc. etc. New Edition. 8vo. with nearly 1,000 Woodcuts, 50*s.* cloth.

WHEATLEY.—THE ROD AND LINE;

Or, Practical Hints and Dainty Devices for the sure taking of Trout, Grayling, etc. By Hewett Wheatley, Esq., Senior Angler. Foolscap 8vo. with 9 coloured Plates, 10*s.* 6*d.* cloth.

LADY WILLOUGHBY'S DIARY.

Printed, ornamented, and bound in the style of the period to which *The Diary* refers (1635 to 1663). New Edition; in Two Parts. Square foolscap 8vo. 8*s.* each, boards; or 13*s.* each, bound in morocco by Hayday.

WILMOT'S ABRIDGMENT OF BLACKSTONE'S COMMENTARIES ON THE LAWS OF ENGLAND,

intended for the use of Young Persons, and comprised in a series of Letters from a Father to his Daughter. A New Edition, corrected and brought down to the present day, by Sir John E. Eardley Wilmot, Bart., Barrister-at-Law, Recorder of Warwick; and inscribed, by permission, to H.R.H. the Princess Royal. 12mo. price 6*s.* 6*d.* cloth.

WOOD'S ELEMENTS OF ALGEBRA,

Designed for the use of Students in the University. Fourteenth Edition, revised and enlarged, by Thomas Lund, B.D. late Fellow of Sadlerian Lecturer of St. John's College, Cambridge. 8vo. price 12*s.* 6*d.* cloth.

LUND'S COMPANION TO WOOD'S ALGEBRA:

Containing Solutions of various Questions and Problems; and forming a Key to the chief Difficulties found in the Collection of Examples appended to *Wood's Algebra*. Second Edition, enlarged. Post 8vo. price 6*s.* cloth.

YOUATT.—THE HORSE.

By William Youatt. With a Treatise of Draught. A New Edition; with numerous Wood Engravings from Designs by William Harvey. 8vo. 10*s.* cloth.

*** *Messrs. Longman and Co.'s Edition should be ordered.*

YOUATT.—THE DOG.

By William Youatt. A New Edition; with numerous Wood Engravings from Designs by William Harvey. 8vo. 6*s.* cloth.

ZUMPT'S LARGER GRAMMAR OF THE LATIN LANGUAGE.

Translated and adapted to the use of the English Students, by Dr. L. Schmitz. Rector of the High School Edinburgh: with numerous Additions and Corrections by the Author and Translator. The Third Edition, thoroughly revised; to which is added, an Index (by the Rev. J. T. White, M.A.) of all the Passages of Latin Authors referred to and explained in the Grammar. 8vo. price 14*s.* cloth.

London: Printed by M. MASON, Ivy Lane, Paternoster Row.